MATERIAL HANDLING
FLOW

FRANCHISE INNOVATION CIRCULATION

OCTOBER
1954

• HANDLING • AUTOMATION • PACKAGING AND SHIPPING

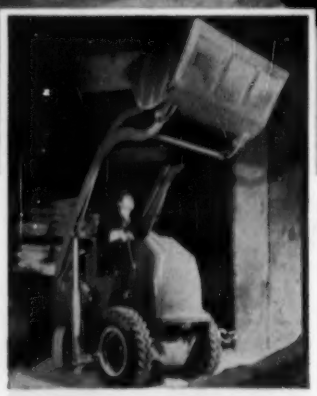
Protection During Handling

. . . top objective of the packaging engineer . . . *page 131*

Complete Table of Contents on page 7

PROTECTIVE PACKAGING featured at the 9th Industrial Packaging and Material Handling Exposition, September 28-30

Good visibility speeds operation of new



HIGH DUMPING HEIGHT of 73 inches is 20 inches higher than most comparable machines, makes it possible to load high truck beds or platforms from the ground.

FAST SHIFTING from forward to reverse —reducing normal reversing time about 95%—is made possible by planetary reversing clutch-type transmission.

• The operator can see his work with the bucket down, with the bucket up, and when he's traveling from one place to another in your plant. He can see what he's doing at *all* times, so he can handle bulk materials fast and efficiently—often at lower cost—with Le Roi Company's new Front End Loader.

He can maneuver easily in and out of boxcars, around pillars and sharp corners because he can turn this machine in a radius of only 74 inches. He can rock the 12 cu. ft. bucket into the load and heap it full in just eleven seconds. He can lift, load, dump, or shift gears with a flick of his wrist—controls are mounted right at the steering wheel. All this saves time, and helps to keep materials handling costs low.

This loader weighs 5250 lbs., is powered by a husky Le Roi gasoline engine. Write for complete details on this new Le Roi TL-50 Front End Loader.

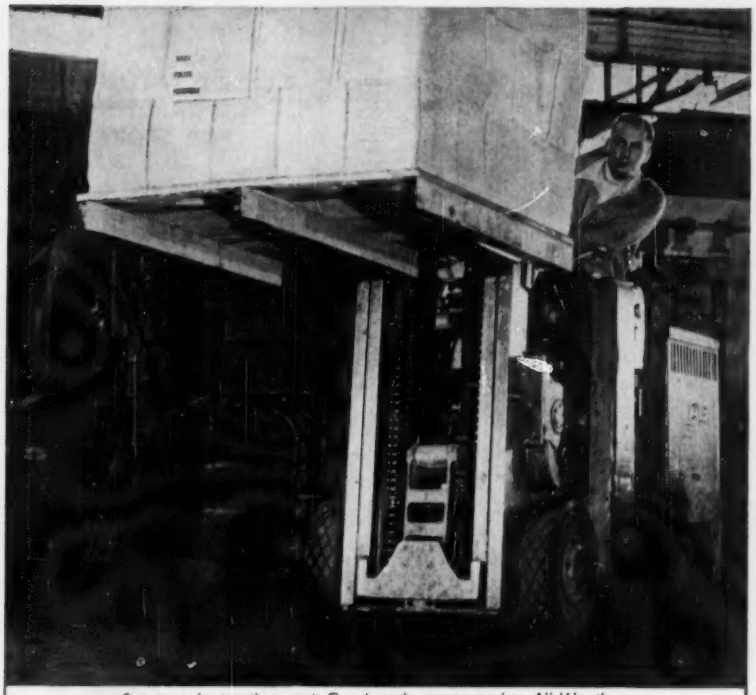
TRANSO DIVISION LE ROI

LE ROI COMPANY

A Subsidiary of Westinghouse Air Brake Co.
TRANSO DIVISION, MILWAUKEE 14, WISCONSIN
Plants: Milwaukee · Cleveland — Greenwich — Dunkirk, Ohio
Coldwater, Michigan
Manufacturers of air compressors, rock drills, engines, loaders and mixers.

Circle No. 158 on Reader Service Card for more information

Next Time Job-Fit Industrial Tires by Size · Tread · Compound



For tops in traction, get Goodyear's even-wearing All-Weather Tread Industrial Solid, shown above

All-Service, All-Weather, Xtra Cushion—T. M.'s The Goodyear Tire & Rubber Company, Akron, Ohio

HERE's how to cure the headaches that come from using the wrong industrial tires. Call your Goodyear Dealer and let him specify the "right tire for the right job." Let him show you how to get top performance from your industrial tires by job-fitting them these three ways:

Right Size for your equipment. Goodyear has over 100 different solid tire types and sizes plus a full line of pneumatic and semi-pneumatic tires — America's most complete line of industrials.

Right Tread for your plant's floor surfaces. Smooth and Grooved for easy rolling. All-Service or the famous All-Weather, wherever traction is needed.

Right Compound for longer tire life. Goodyear offers you a choice of either UNiversal chip-resistant or Neoprene oil- and acid-resistant compound at no extra cost.

Make the first step towards industrial tire savings in your plant by calling your Goodyear Dealer today. Or write:

Goodyear, Industrial Tire Sales, Akron 16, Ohio

USE THE RIGHT TIRE FOR THE RIGHT JOB—USE

GOODYEAR

INDUSTRIAL TIRES

We think you'll like THE GOODYEAR TELEVISION PLAYHOUSE—every other Sunday—NBC TV Network

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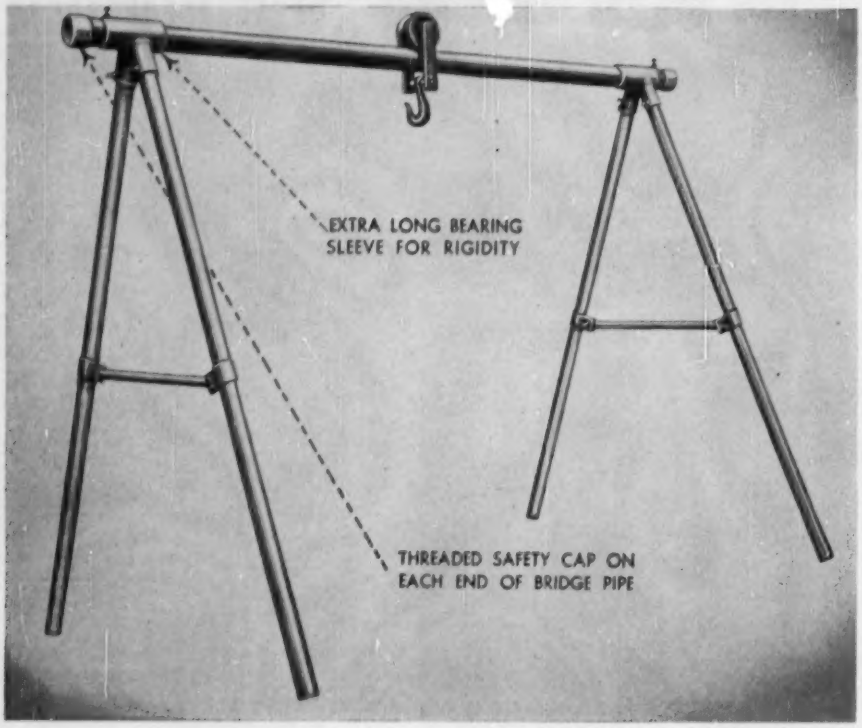
WISE PORTABLE 2-TON CAPACITY GANTRY CRANE



PATENT APPLIED FOR

At Last — A Gantry Crane that is really portable in every sense of the word. Is delivered knocked-down. Can be set up by 2 men in 10 minutes and just as quickly dismantled. Can be lifted easily and placed in position. ¶ Ideal for plants or shops where gantry is needed in several departments. One Crane takes the place of several. Indispensible for garages or anyone having lifting problems off the premises. Engineered and designed for maximum efficiency. Ruggedly built for strength and long-life. ¶ Saves money — Does the work of bigger, bulkier, more expensive cranes.

SPECIFICATIONS

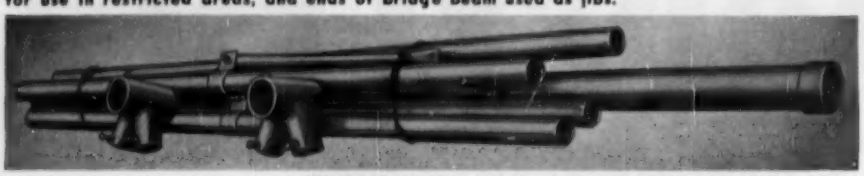
Lifting Capacity	**4000 lbs.**	**Shipping Bundle**	**12" x 12" x 9'**
Finish	**Gray**	**Size of Bridge Pipe**	**3"**
TROLLEY INCLUDED WITH CRANE		**Size of Leg Pipe**	**2"**
4" Wheel Casters with Boots, Extra		**Size of Leg Brace**	**1"**

Model Number	Leg Length	Overall Width of Legs*	Overall Length of Crane	Height to Top of Bridge Beam**	Distance From Hook to Floor	Height to Top of Bridge Beam with Casters**	Distance from Hook to Floor with Casters	Shipping Weight without Casters	Shipping Weight with Casters
G 7	7'	5'-5"	9'	6'-9"	6'-2"	7'-11"	7'-4"	270 lbs.	341 lbs.
G 8	8'	6'-2"	9'	7'-8"	7'-1"	8'-10"	8'-3"	288 lbs.	359 lbs.
G 9	9'	6'-11"	9'	8'-7"	8'-	9'-9"	9'-2"	303 lbs.	374 lbs.
G 10	10'	7'-8"	9'	9'-6"	8'-11"	10'-8"	10'-1"	317 lbs.	388 lbs.

*Same width with casters

**Add 4" for height of trolley above bridge beam

Also fabricated to specifications in 3 and 5 ton units. A-FRAMES can be set close together for use in restricted areas, and ends of bridge beam used as jibs.



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QUICKLY ASSEMBLED OR DISMANTLED

•

EASILY TAKEN APART FOR CARRYING OR FOR STORAGE

This amazing new gantry crane dismantles into a compact unit as shown in bottom illustration for easy storage or transporting from place to place. Or stand it in any corner. Special slip-on boots with casters are available where a considerable amount of moving around on the job is required. Note illustration below showing crane leg notched out and resting solidly on welded-in bolt to avoid any chance of slipping or turning. Boots are made slightly oversized so that they can quickly be attached and removed.

FOR GREATER PORTABILITY →

REMOVABLE BOOTS WITH 4-INCH CASTERS

•

WELDED BOLT POSITIONS BOOT ON LEG

WISE

ENGINEERING COMPANY

68 CHAPEL STREET

NEWARK 5, N. J.

Here's The Truck The Motor Freight Industry Helped Design!

Automatic's NEW "DOCKER"

offers you these important features:

- ✓ **Designed primarily for truck trailer and loading dock work, but applicable for *all* congested-area duties!**
- ✓ **More compact, safe, maneuverable... meets the needs outlined by experts in the shipping field!**

Use this chart to PROVE the "DOCKER" leads in features:

FEATURE	BENEFIT
1. Compact. Shortest truck of its type.	Superior maneuverability on shipping docks, inside trailers, and all other close-quarter areas.
2. Lowest step height—only 7".	For safer, low-clearance operation.
3. Highest free lift—55".	Enables stacking in trailers.
4. Fastest lift speed.	Does more work, faster.
5. Top travel speed.	Quicker loading and unloading.
6. Quick maintenance... by removing three panels the entire mechanism of the truck is exposed.	Easier to service, minimum down time, reduces maintenance costs.
7. Top grade clearance. Four wheel suspension and very low center of gravity.	Gives truck maximum stability, yet excellent underclearance for operation on grades and over bridgeplates.
8. Standup end control.	Provides greater convenience and safety for operator.
9. Two studs on uprights for pulling loads too heavy to be lifted.	Permits horizontal movement of heavy loads without damage to truck.

Here's a new, compact, standup end control fork truck that ideally meets materials handling needs for loading docks and other congested areas. The "Docker" is electric-powered, thus offers the *proved* operating economy and reliability only an electric truck provides. The "Docker" is the one truck that includes *all* the "most-wanted" features in its field—as is proved by Feature Chart at left!

Although the "Docker" is designed primarily for the trucking industry, it is applicable to all industries...since all plants have a shipping operation. The "Docker" is also ideal for all materials handling where working space is a problem—order picking, warehousing, manufacturing, etc. So—no matter what field of business you are in—look into the advantages of the compact, feature-packed, new "Docker," *today!*

Available in Mono-lift or Duo-lift,
1,000 to 3,000-lbs. capacities

Mail Coupon Today For Full Details

Automatic®

WORLD'S LARGEST EXCLUSIVE BUILDER OF ELECTRIC-DRIVEN INDUSTRIAL TRUCKS

Automatic 141 West 87th St., Dept. T-4 Chicago 20, Illinois

Without obligation, please send me full information on the new Automatic "Docker."

Company Name.....

By.....Title.....

Address.....

City.....Zone....State.....

Circle No. 22 on Reader Service Card for more information

17 places you can save on costs with one material...MULT-A-FRAME!

1. Cable and pipe hangers
2. General stock racks
3. Wall inserts
4. Mobile tote box racks
5. Die racks
6. Work platforms
7. Pallet racks
8. Lighting fixture hangers
9. Shelving
10. Partitions
11. Barrel racks
12. Sheet metal storage
13. Work benches
14. Work tables
15. Stock cars
16. Drafting tables
17. Bar racks

ASSEMBLE IN 3 SIMPLE STEPS:

1. Insert Spring -T-Bolt
2. Add fitting
3. Add nut

ONLY MULT-A-FRAME GIVES YOU ALL THESE ADVANTAGES:

1. T-Bolt stem makes it easy to insert from *outside* of channel.
2. Arms of T-Bolt *overlap flange of channel*, prevent spreading.
3. Spring holds T-Bolt in place for positioning of all fittings before tightening.
4. Contact points on T-Bolt fit in serrations rolled in frame. Assures firm joint without excessive wrench torque. *Bolt does not have to cut its own serrations; does not crush flange.*
5. Raised nubs on Safe-Locking Fitting "key" into slot, giving rigid box joint; prevent Fitting from rotating.

New fully-locking steel framing material gives you skyscraper strength without bulk in racks, hangers, frames, etc. . . . cuts time and labor costs!

As shown in the "plant" above, you too need only one basic material, MULT-A-FRAME, to solve not only your framing and racking problems, but many others . . . in every department.

MULT-A-FRAME's 3 basic parts assemble by hand with a common hand wrench. Channel Frame, Spring-T-Bolt, and a wide variety of fittings can be combined to let you build assemblies of unlimited size and shape.

Use MULT-A-FRAME over and over. No matter how you assemble it initially, it's never obsolete. When your present need passes, disassemble it and convert it to new uses. You save because *you never scrap it.*

Our engineers are ready to help you. Authorized Distributor warehouse stocks in all principal cities. WRITE TODAY FOR FREE CATALOG AND SAMPLES.

MULT-A-FRAME
Patents Pending

MULT-A-FRAME DIVISION
1471 East Atwater Street, Detroit 7, Michigan

Ainsworth Manufacturing Corporation

Circle No. 2 on Reader Service Card for more information

It gets to the job on road wheels... then quickly moves freight cars!

TRACKMOBILE

...seasoned workhorse in every industry!

It *pulls* freight cars . . . *switches* them . . . *spots* them! The Trackmobile does *all* these jobs with amazing versatility because it operates on road or track—*can't* be bottled-up.

Three years ago the Trackmobile was introduced. Today it reduces costs, saves man-hours, speeds freight car movement for firms in scores of industries! It has *proved* itself in all types of uses, be it quarry or steel mill, foundry or refinery. It will do an outstanding job for *you* . . . look into Trackmobile advantages now!

WHITING CORPORATION
15659 Lathrop Ave. • Harvey, Illinois

Write Today!

. . . ask for case histories of the Trackmobile in action!

The Trackmobile shown above has efficiently served its owner for over 3 years.

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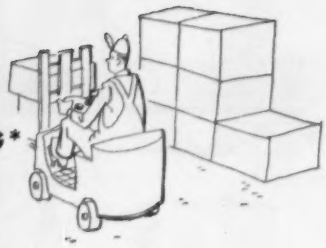
the advantage of IBH

IN-BETWEEN HANDLING*



*Short distance hydraulic manipulation of materials too heavy for manual handling yet not requiring high priced power-driven equipment.

and – more than 40

BIG JOE®

LIFT TRUCK MODELS

"In-Between Handling" has one primary advantage—you can custom build your materials handling system to the exact requirements of your plant! *You no longer need to invest in excess capacity.* You don't have to support high-priced equipment that sits idle one moment and fails to provide adequate capacity the next. IBH* means "NO PEAK LOAD BOTTLENECKS."

"BIG JOE" hydraulic lift trucks are exclusive IBH* tools. They save production time which normally accrues when one department waits for another. They bring you profit from a lower capital investment, reduced operation and maintenance overhead as well as from greater safety.

Likewise, "BIG JOE" lift trucks work in congested areas where power-driven units cannot operate. No special operators are required—anyone can use a "BIG JOE." You can obtain the same lifting and stacking efficiency as provided in a power-driven fork truck—yet your investment is only a fraction of the cost.

"BIG JOE" offers a choice of more than 40 foot and battery operated 6 and 12 volt system units—fork and platform types—lever control, push button or throttle control . . . all guaranteed for quality.

BIG JOE

"HYDRAULIC HANDLING FOR EVERY DEPARTMENT"

BIG JOE MANUFACTURING COMPANY

900-08 Jackson Blvd., Chicago 7, Illinois

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MATERIAL FLOW

October, 1954
Vol. 10, No. 1

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FLOW Magazine is published by The Industrial Publishing Group, a Division of Telenews Productions, Inc., which also publishes:
FLOW QUARTERLY
PRECISION METAL MOLDING
APPLIED HYDRAULICS
INDUSTRY AND WELDING
OCCUPATIONAL HAZARDS
COMMERCIAL REFRIGERATION AND AIR CONDITIONING

CONTENTS

FEATURES

Material Handling in a "Best Managed" Firm 71
How Bulk Behaves 74
For Economical Handling, Consider Castered Equipment 78
Special Trucks for Handling Special Jobs 80
What's Wrong with Material Handling? 85
Revolvator Reviews 50 Years of Progress 87
Patent Review 88
A Practical Manual of Material Handling Procedure 90
Safe Scrap Handling 94

PACKAGING AND SHIPPING SECTION

You Pay for Damage Insurance 133
Shock and Vibration 136
Protecting Against Shock and Vibration 140
The Battle Against Moisture 144
Product Loss = Profit Loss 152
What's New in Packaging & Shipping Equipment 163

DEPARTMENTS

Advertisers' Index 193
Association and Society News 36
Calendar of Events 54
Classified Advertisement Section 192
Highlights of the Month's News 17
Letters to the Editors 10
Literature Featured in Ads 56
Men in the News 30
News From the Sales Field 46
News, Views & Trends 20
What's New in Equipment 40
What's New in Useful Free Literature 114

FLOW is indexed regularly by Engineering Index, Inc.

SUBSCRIPTION RATES

United States and possessions—$3.00 per year, $5.00 for 2 years. Subscriptions in the United Kingdom: £1.10 per annum, payable in Sterling to our London Office.

Canada—$4.00 per year, $6.00 for 2 years.

Foreign—$5.00 per year.

Single copy price—30 cents.

Published Monthly

"Acceptance under section 34.64 P. L. & R. authorized at Pontiac, Illinois."

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Hartley . . . since he discovered
Heppenstall Tongs

There's no limit to the range of jobs that HEPPENSTALL SAFE-T-TONGS handle quickly, safely, economically

Whatever your handling job requires—regardless of shapes, weights, or sizes—a Heppenstall Safe-T-Tong engineered specifically to your needs will help you speed materials handling operations with greater efficiency and safety. Call Heppenstall now. Obtain complete information and technical assistance. Heppenstall Company, Pittsburgh 1, Pa. Sales offices in principal cities.

Heppenstall

. . . TONGS FOR EVERY LIFTING PROBLEM

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Truck Investment Cut 40%

The Problem—A Canadian producer of insulation board required a truck able to transport lengthwise, loads 9′ *long* weighing a maximum of 4,400 lbs. They found that carrying these relatively light but extra long loads on a fork truck would require a 10,000 lb. capacity machine. The cost of such a truck seemed excessive for the actual weight to be handled.

The Solution—*By ELWELL-PARKER ENGINEERS*—They replaced the platform of an Elpar high lift truck with forks. The forks were made 41″ long for crosswise handling and 81″ long extensions were supplied for carrying loads lengthwise. Using this type of truck, far less capacity is needed—because the forward underframe and wheels support much of the load. In tiering, the bottom load rests on dunnage or skids to permit entrance of the front wheels.

The Result—Truck purchased cost about 60% of the price of a 10,000 lb. fork truck. It also required less battery capacity. Thus a difficult load handling problem has been solved with savings of thousands of dollars.

For *your* unusual load or handling problem, take advantage of Elpar Special Engineering. It is available without obligation when a standard Elpar model will not suffice.

New Booklet—Explains this unique special engineering service in detail. Write The Elwell-Parker Electric Company, 4289 St. Clair Ave., Cleveland 3, Ohio.

ELPAR
INDUSTRIAL TRUCKS

Circle No. 66 on Reader Service Card for more information

TENNANT "K" dry-shaves dirt from floor; cleans 16" path.

How one man with a TENNANT Floor Machine . . .

shaves grease-caked dirt from factory floors – in 1 operation

As you guide it down an aisle, this big powerful TENNANT Machine does a cleaning job you'll find hard to believe. It outperforms a crew of men.

It combines 3 operations, shaving off thick grease-caked dirt at the rate of 8 to 20 lbs. per minute!

1. Shaves off thick deposits from floor by high speed pulverizing action of scarifying cylinder. Cleans 16" path. Works *dry*—no need for water or detergents.

2. Smooths and levels surface by exclusive planing action; doesn't dig or gouge floor. Helps level humps. Leaves good clean surface for fast, safe trucking.

3. Picks up soilage as it goes. Hurls traffic-packed dirt and grime into hopper. Does entire cleaning job in 1 operation. Gas or electric models (to 7.3 hp); also 25 hp mobile-type units. *Write today for details.*

TENNANT
ESTABLISHED 1870

G. H. TENNANT CO.
2576 N. 2nd Street
Minneapolis 11, Minn.

FLOOR MACHINES

INDUSTRIAL MAINTENANCE EQUIPMENT

Circle No. 145 on Reader Service Card for more information

LETTERS to the editors

Small Production, Seasonable Product

To FLOW:

We are manufacturers of cotton flannel which is packed in cartons, approximately 38 inches square, of 1,000 yards and weighs, after packing, from 250 pounds to 300 pounds. Our production is about 80 cases a day, and we have to stack these in warehouses for future shipment, as it is a seasonable product. We have four different warehouses and need a lift of some kind to be used in stacking the cartons.

If you know of a hand-lift that would be suitable for this type of stacking and keeping the warehouse in order, we will greatly appreciate it if you will give us information regarding same.

John W. Clark
President
The Randolph Mills, Inc.

A hand-operated portable elevator would accomplish the desired results for Randolph Mills. There are many such elevators on the market, and their manufacturers have been contacted on Reader Clark's behalf.

Magnetic Chuck Elicits Interest

To FLOW:

There is a product mentioned in an article of the June '54 issue of FLOW in which we are interested; the self-contained magnetic chuck operating off of a 6-volt storage battery which is described briefly toward the end of the article by John E. Hyler on "Magnetic Muscles for Heavy Handling".

Any information you could give us on the manufacturers of such equipment would be greatly ap-

Free *Rapistan*® field reports on

Profit Saving Methods

Here is a wealth of information you will find in no other place. From every part of the country, from every line of business, we have collected valuable information on how successful companies have solved their materials handling problems. Each report gives you the problem, lists the equipment, shows photos of the installation and describes the results. Any of these reports or the many others in our files, are yours for the asking.

Just check the ones you want . . . tear out this page, and mail it with your name and address to Rapistan at the address below.

☐ ***APPAREL COMPANY*** Handling reduced 75%, rush orders move quickly, marking and pricing more efficient. F.R. 50

☐ ***APPLIANCES*** **Hand trucking cut 80%, congestion relieved, marring and scratching stopped, order processing speeded. F.R. 13**

☐ ***AUTOMOTIVE PARTS COMPANY*** Slashes time unloading 600 lb. motors by 66%. Over 3 years of operation without a single mechanical failure. F.R. 33

☐ ***BAKERY*** **One man replaces 6-man crew loading trucks. Bread handled only once, package remains uncrumpled. F.R. 55**

☐ ***BEVERAGE DISTRIBUTOR*** Increases loading and unloading efficiency. Improves warehousing and bottling operation. Speeds-up delivery. F.R. 51

☐ ***BOOKS AND MAGAZINES*** **New construction made unnecessary by Rapistan system which utilizes previously unused space. F.R. 28**

☐ ***BOTTLING COMPANY*** Rapistan system handles increased production, pays for itself in first season. F.R. 10

☐ ***BUILDING SUPPLIES*** **How to take the heavy work out of stacking, handling, carrying, bulky, hard-to-handle building goods. F.R. 44**

☐ ***COSMETICS*** Now handled with 1/3 time and labor previously required. Checking and packing simplified. Stock-room space increased. F.R. 35

☐ ***DRUG SUNDRIES*** **Warehouse efficiency increased 50%. Order-picking efficiency increased 60%. Overtime eliminated. F.R. 49**

☐ ***FARM PRODUCE*** Kept moving smoothly — even at season's peak. Output increased 25%. $20 per week saved on labor costs. F.R. 3

☐ ***FLOOR COVERINGS*** **Flexible system efficiently handles 700-lb. rolls of carpeting or heavy cartons of tile. Reduces fatigue, speeds delivery. F.R. 5A**

☐ ***FOOD PROCESSOR*** Saves time and increases production with smooth flow of bulky, heavy cartons. F.R. 18

☐ ***FURNITURE COMPANY*** **Saves 25% in labor, 40% in clean-up cost. Workmanship improved. Work-in-process reduced 35%. Damage eliminated. F.R. 14**

☐ ***HARDWARE WAREHOUSING*** Sysiem handles 400-lb. bathtubs, plumbing fixtures and nail kegs easily. Cuts unloading time as much as 75%. F.R. 38

☐ ***LAUNDRY*** Increases delivery efficiency 20%. **Extra space now available through elimination of congestion. Housekeeping 50% easier. F.R. 4**

☐ ***MEAT PACKER*** Cuts operating and truck loading cost 50%. Rapistan system eliminates spoilage, speeds delivery. F.R. 17

☐ ***NEWSPAPERS*** **Circulation department handles 100% increase in press production, yet meets delivery schedules with with same crew. F.R. 40A**

☐ ***PAINT PRODUCTS*** Heavy 5- and 10-gallon chimed cans quickly moved in AND out of remote 2nd floor storage. F.R. 5

☐ ***POULTRY PRODUCTS*** **Breakage and damage to egg cases and contents is eliminated. Fast handling cuts truck turn-around time. F.R. 48**

☐ ***PRESS ROOM*** Stampings automatically delivered to tote boxes adding 1/2 hour daily to press production time. F.R. 37

☐ ***PUBLIC WORKS*** **2 men with Rapistan remove bagged chemical from storage, slit bag, fill 5-yd. truck in 5 minutes. F.R. 54**

☐ ***RETAIL GROCER*** Saves $2,000 a year. Utilizes basement space. Gains efficiency in checking and pricing. F.R. 25

☐ ***STAMPINGS*** **System speeds up production 25%, eliminates 400 shop trucks and lightens work of operators. F.R 7.**

☐ ***SUPERMARKET*** Fast, convenient carry-out service saves $225 a week — attracts customers. Reduces parking lot congestion. F.R. 20A

☐ ***TIRES*** **Rapistan system cuts unloading time in half for wholesaler who previously used elevator and trucks. F.R. 18A**

☐ ***TOBACCO AND CANDY*** Man-hours reduced 75% for unloading and storage. System permits greater volume at lower cost. F.R. 26

☐ ***TOOLS*** **Small parts orders speeded up 25%. Faster delivery service improves customer relations. F.R. 11**

☐ ***WASTE MATERIALS*** Unloading time cut 50%. Loading crew reduced 1/3. F.R. 20

☐ ***WHOLESALE GROCER*** **Cuts operating cost $600 per month. Reduces unloading time 50%, shipping time 30%. Handles 25% more goods. F.R. 1A**

☐ ***WHOLESALE PRODUCE*** Four man crew loads twice as many trailers per shift after installation of Rapistan system. F.R. 52

The RAPIDS-STANDARD COMPANY, Inc.
171 Rapistan Bldg., Grand Rapids 2, Mich.

Name_____

Company_____

Address_____

City_____ Zone____ State_____

Rapistan® BETTER CONVEYING EQUIPMENT
CONVEYORS, gravity and power belt · INDUSTRIAL CASTERS · WHEEL-EZY® TRUCKS

Circle No. 132 on Reader Service Card for more information

WITH THESE AUTOMATIC DOORS, THERE IS
NO SMOKE ALLOWED
AT THE CONSOLIDATED CIGAR CO.
SMOKE CAN RUIN FINE TOBACCO . . .
so leading tobacco growers, like the Consolidated Cigar Co. in Glastonbury, Conn., protect their crop in storage by doors equipped with Stanley Magic Door Controls. Because of their instant automatic opening . . . and positive closing when traffic has passed through, these automatic doors provide practical insurance against the entrance of ruinous smoke.

STANLEY® *Magic Door* CONTROLS

CAN PROTECT YOUR PRODUCTS,
SPEED MATERIALS HANDLING . . . TOO

When doors in your plant open and close automatically, you can count on these added advantages:

The "left-opened" door is completely eliminated. Your plant is protected against loss of conditioned air.

Plant traffic and materials handling is stepped up. Time-wasting door man-handling is a thing of the past.

Maintenance on doors and equipment is reduced. Stanley Magic Door Controls open plant doors as traffic approaches . . . hold them open while traffic passes through . . . then close doors — silently, securely.

Magic Door Controls are saving time, money, and manpower in many plants. Existing doors are easily equipped regardless of whether they swing, slide, or fold. See your Stanley Field Engineer for all the facts!

MAIL THIS COUPON for complete information on Stanley Magic Eye (photoelectric) and Magic Carpet Controls; also pull cords and switches.

Representatives In Principal Cities

THE STANLEY WORKS, MAGIC DOOR DIVISION
30110 Lake St., New Britain, Conn.

☐ Please send full information on Stanley Magic Door Controls.
☐ Have representative call.

Company Name_____
My Name_____
Address_____
City_____ Zone_____ State_____

STANLEY TOOLS • STANLEY HARDWARE • STANLEY ELECTRIC TOOLS • STANLEY STEEL STRAPPING • STANLEY STEEL

Circle No. 190 on Reader Service Card for more information

LETTERS

Continued

preciated. We believe such a device has potentialities in our shop.

L. D. Hale
Production Engineer
Halliburton Oil Well Cementing Co.

The several manufacturers of the magnetic chuck have been advised of Reader Hale's interest in their product.

We Don't Know

To FLOW:

One of my customers is in the market for a flexible 11½ inch wheel conveyor that can be made to make a curve by bending it in the direction that you desire to have the curve. I am agent for the manufacturer of regular gravity conveyor, but they do not make the flexible conveyor.

Should you know of any manufacturer of this flexible, would you please advise me.

J. M. Farrell
New Orleans, La.

There are 90 degree curves, 180 degree curves, "Y" switches and ball transfer tables, but we do not know of a flexible wheel conveyor that will bend in the direction of the curve, as described by Reader Farrell. Can you readers supply us with the answer?

Telescoping Conveyor

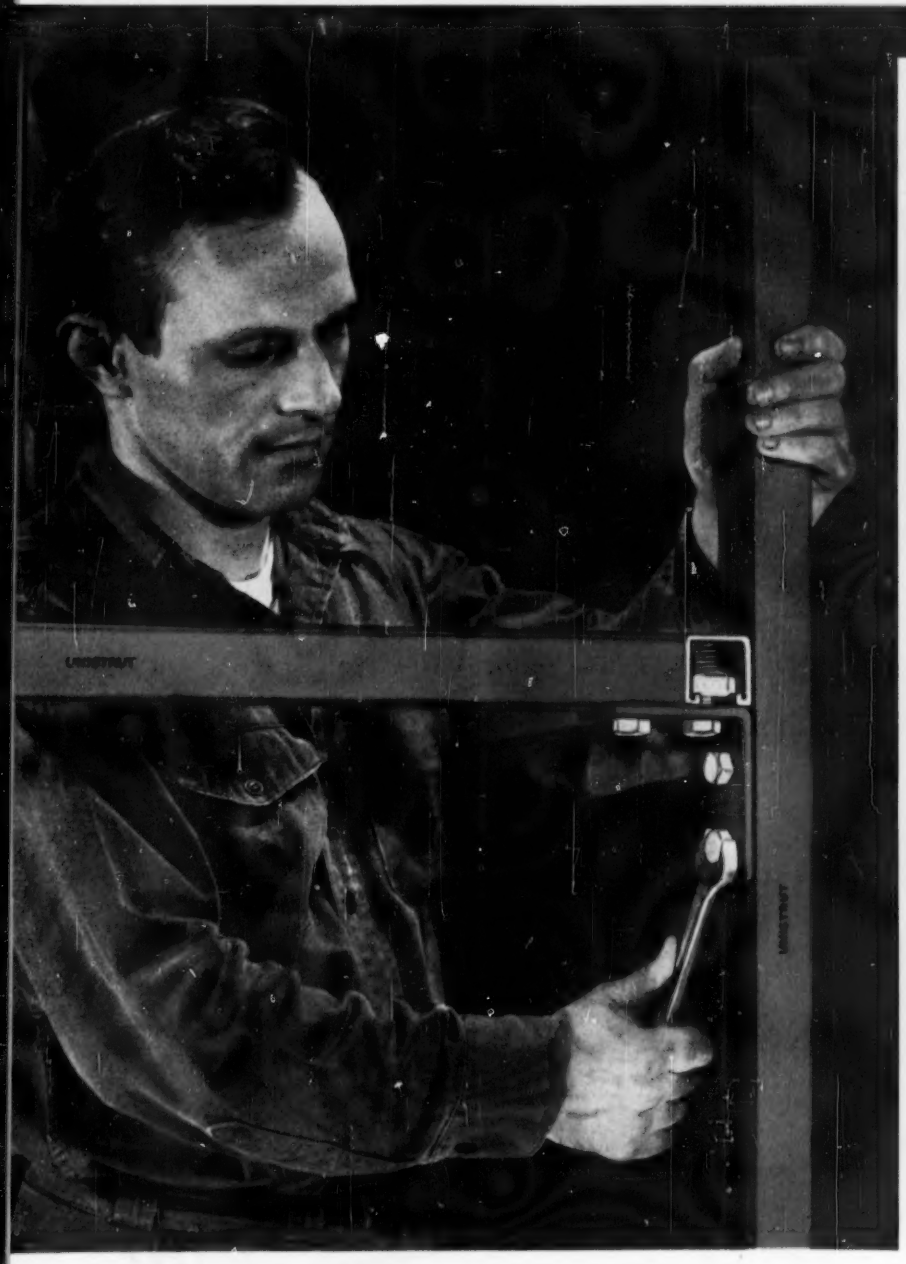
To FLOW:

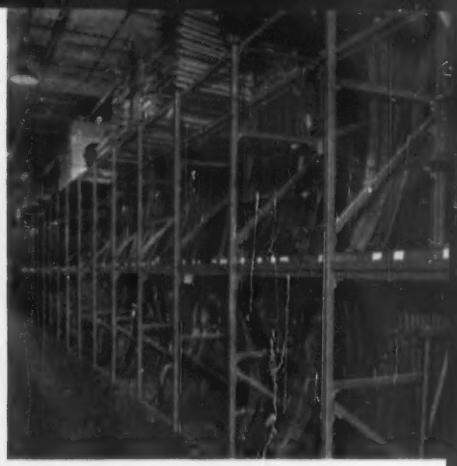
Please send me information as to the manufacturer of two conveyors shown in your February 1954 edition on page 72.

The ones I am interested in are the pivoting curve in a telescoping wheel system, to be used in loading boxcars, and the telescoping belt conveyor shown loading a trailer.

George H. Webber
The B. F. Goodrich Company

FLOW was happy to oblige Reader Webber with the requested information on telescoping belt and wheel conveyor systems.





UNISTRUT racks are built to satisfy requirements of part size, accessibility and floor space. Strong, rigid UNISTRUT channel supports tremendous weight, yet is easily adjusted or changed at any time.

International Harvester's parts depot in Broadview, Illinois, uses many racks of UNISTRUT framing to store heavy tractor and farm machinery parts conveniently. Note the simple, efficient method of fender storage.

Adjustable UNISTRUT® framing builds low-cost racks any size, shape

Racks of UNISTRUT framing are assembled, like the one shown above, from standard channel and fittings. No welding, drilling or skilled labor required. You can build in any space available. There are no rules on size or shape—floor area and storage needs determine dimensions.

Unused floor space can become valuable storage. And with a UNISTRUT rack, you can take it down, put it up in a different spot, different shape whenever desired. Use it over and over, even for other purposes—supporting or framing for almost anything. Your investment is never lost.

It takes little time and engineering to erect a UNISTRUT rack. Your UNISTRUT Distributor can show you how this versatile steel framing will solve your most difficult storage problems inexpensively. Warehouse stocks in all principal cities. In Canada, Northern Electric Company.

Something to see—

New UNISTRUT film in color and sound "The Sky's The Limit"

Demonstrator car—all parts and uses of UNISTRUT framing.

Ask your UNISTRUT Distributor!

U.S. Patent Numbers
2327587
2329815
2345650
2363382
2380379
2405631
2541908
Other Patents Pending

The World's Most Flexible All-Purpose Metal Framing

Free rack catalog!

Write today for free copy of UNISTRUT rack catalog No. 600.

UNISTRUT PRODUCTS COMPANY
1013 W. Washington Blvd. Dept. A-10
Chicago 7, Illinois

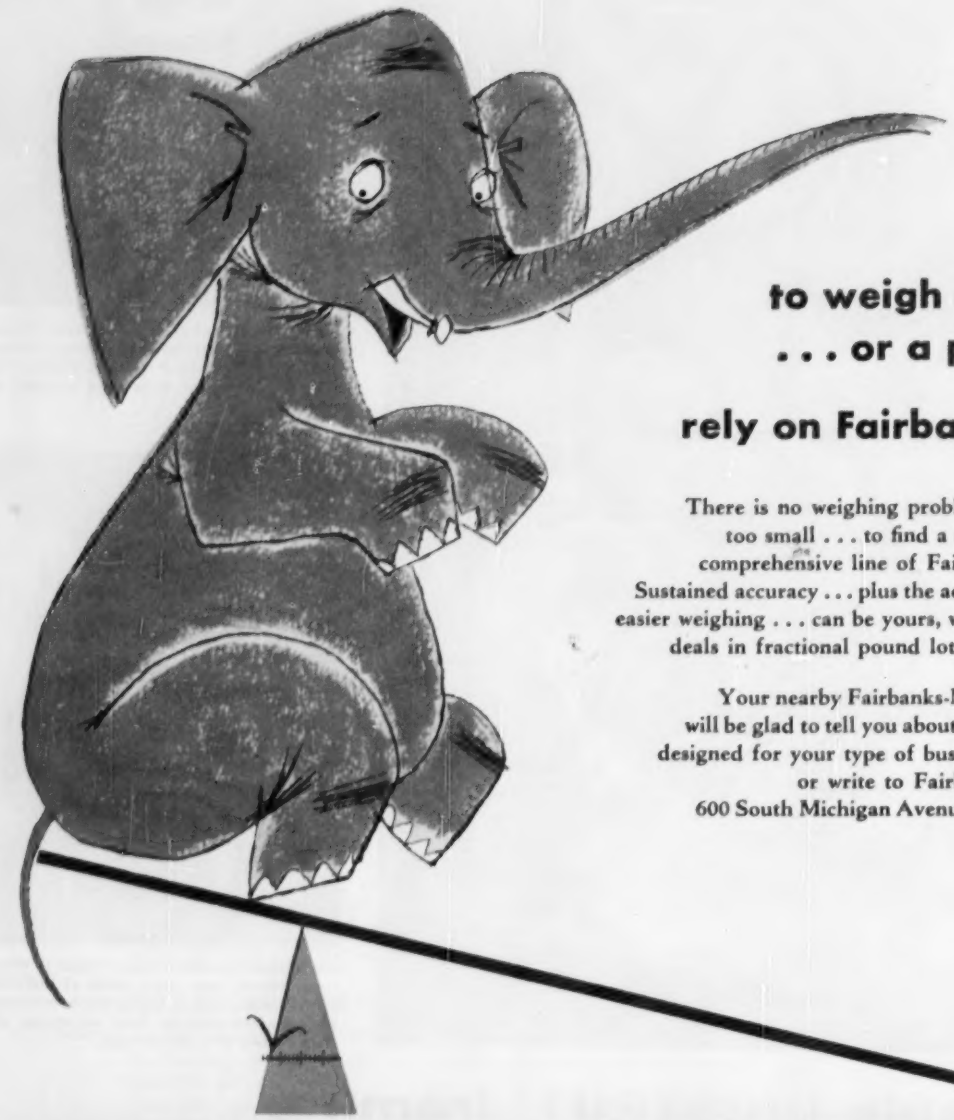
Name.....

Company.....

Address.....

City.....*Zone*.....*State*.....

Circle No. 153 on Reader Service Card for more information

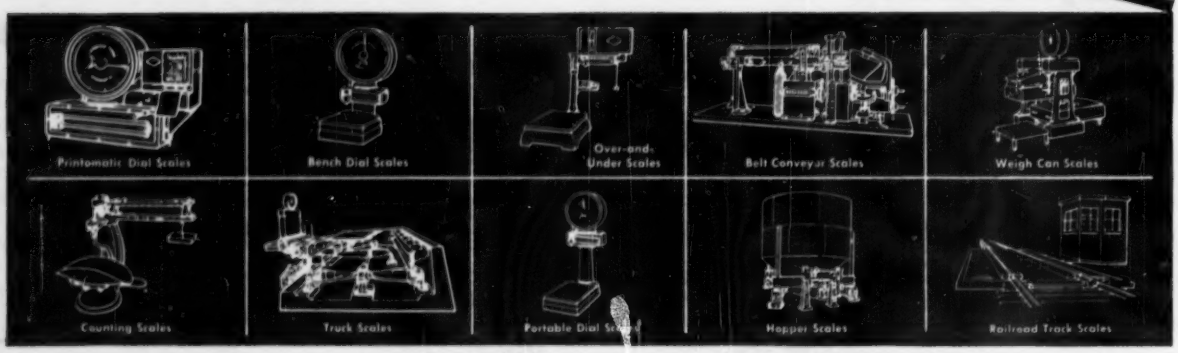


to weigh a package . . . or a pachyderm

rely on Fairbanks-Morse

There is no weighing problem too large . . . or too small . . . to find a sound solution in the comprehensive line of Fairbanks-Morse Scales. Sustained accuracy . . . plus the advantages of speedier, easier weighing . . . can be yours, whether your business deals in fractional pound lots . . . or truck loads.

Your nearby Fairbanks-Morse Scale Specialist will be glad to tell you about the scales specifically designed for your type of business. See him soon, or write to Fairbanks, Morse & Co., 600 South Michigan Avenue, Chicago 5, Illinois.



FAIRBANKS-MORSE

a name worth remembering when you want the best

SCALES • PUMPS • DIESEL LOCOMOTIVES AND ENGINES • ELECTRICAL MACHINERY • RAIL CARS • HOME WATER SERVICE EQUIPMENT • FARM MACHINERY • MAGNETOS

Circle No. 68 on Reader Service Card for more information

Clark puts the driver where he belongs

. . . on the new

ELECTRIC TOWING TRACTOR

Clark's new electric towing tractor, rated up to 3000 lbs. breakaway drawbar pull, is the first *true* tractor-type electric machine on the market. The driver sits where he belongs—at the rear of the tractor, within arm's reach of the coupler. He does not have to get off the tractor to couple onto a load. He does not have to jockey around to get in position to hook-up, because he can see the coupler from his seat. This means time savings and energy savings (for both driver and batteries).

Another advantage of this basic design is the well balanced distribution of battery weight for both maximum driving and steering traction. Regardless of steep ramps or heavy pulls, there is no "bucking" with the maximum battery weight positioned within the wheelbase. And like Clark electric lift trucks, the new tractor is designed to work a longer cycle without recharging batteries—the maximum in battery efficiency.

Easy on-and-off access

Finger-tip direction control

Rigid box-type frame: Heavy integral welded plates provide strength for bumping, pushing or pulling.

Four speeds forward and reverse

Four coupler types available

Straight series wound motor: develops comparatively large increases in torque with only moderate increase in current draw; 36 to 48 volts; sealed-for-life bearings.

Parts interchangeability: Many components are common to the Clark line of electric lift trucks.

For details, contact your local Clark dealer, listed under "Trucks, Industrial" in the Yellow Pages. Or write us direct for specifications.

CLARK® EQUIPMENT

Industrial Truck Division
CLARK EQUIPMENT COMPANY
Battle Creek 13, Michigan

Circle No. 45 on Reader Service Card for more information

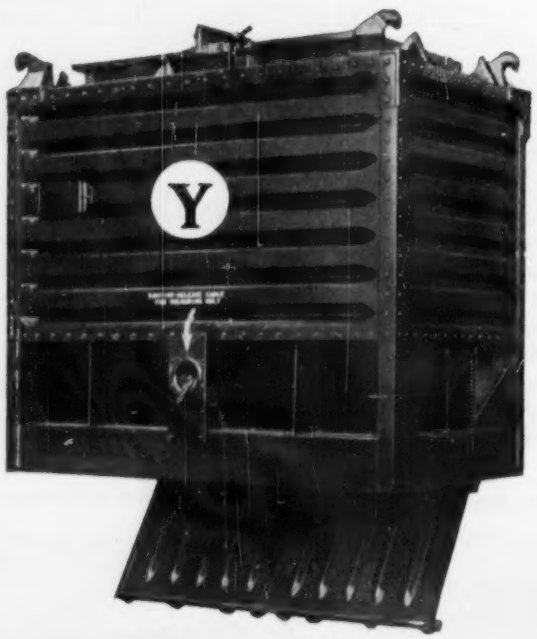
A GOOD TO FOLLOW

Whenever you require quick and complete discharge of materials with a minimum of expense and an optimum of ease and simplicity of operation.

Give thorough consideration to Youngstown's quick and complete bottom discharge bulk materials container.

Save Time and Money. The single hinged discharge door on the bottom of the container is quickly opened by a gentle pull on a release cable which retracts a swinging latch that maintains the door in closed position. To close the door, which is suspended at an angle of 55° to the horizontal when open, the container is simply lowered upon the floor or ground. In closing the door engages and actuates the latch, which automatically and securely locks the door. You have complete assurance, without time-consuming inspection, that the door is locked before the container is again loaded.

Slash Handling Costs. For ordinary handling of the containers only one man is sufficient in addition to the crane or fork-lift truck operator. However, the discharge door can, with slight change in container design, be opened directly from the crane cab or truck by the operator. The one man is thereby eliminated. Cost is further slashed since for crane handling only single drum hoisting equipment is necessary.



Long Life. Engineering "Know-how" and expert workmanship insure rugged containers, which with ordinary care will give many years of efficient and economical service.

Flexibility of Design. Youngstown works with you to adapt its basic design of container to your needs so that you too can secure the many advantages this design has to offer.

THE YOUNGSTOWN STEEL DOOR CO.

Camel Sales Company • Camel Company Limited

CLEVELAND • CHICAGO • NEW YORK • YOUNGSTOWN

Circle No. 165 on Reader Service Card for more information

Highlights

of the month's news

COMPLETION of all arrangements for the 1956 Material Handling Institute's Exposition in Cleveland has been officially announced by the MHI's Board of Directors and its Show Committee. Floor plans have been approved for the show, which will be held June 5 through 8, and which will be managed by the firm of Hanson & Shea, Inc., of Pittsburgh.

One hundred thousand square feet of exhibit space will be available to material handling equipment manufacturers. Educational sessions will be held at times which will not interfere with show hours, and the American Material Handling Society, Inc., will plan these sessions with the MHI Show Committee.

* * *

There's more news from the Institute this month. An all-day working conference on new concepts on the economics of integrating material handling to transportation (from the management viewpoint) will convene in Chicago's Drake Hotel October 20, according to the MHI's Industry Service Committee.

Attendance at the conference, which is co-sponsored by the Chicago Association of Commerce and Industry, will be limited to policy-making executives of the transportation and manufacturing industries in the Chicago area, and will be by invitation only.

* * *

"Who Invented the Belt Conveyor?" is the thought-provoking title of a paper written by Hans W. von der Recke, Hewitt-Robins engineer, and brought to our attention by the Conveyor Equipment Manufacturers Association. The paper, incidentally, is printed in a current Association bulletin.

Without a doubt, the author spent considerable time and effort on a thorough research job, and the result is a highly informative history of the early beginning and later development of the belt conveyor. Actually, the question he poses in his title remains unanswered, since, as he points out, no one individual can be credited alone with the invention. He further states the history of the belt conveyor proves to be a series of developments pushed forward by contributions of outstanding personalities.

However, Mr. von der Recke reveals that existing records credit the first date in history involving the utilization of mechanical material handling as occurring some 2500 years ago. Away back then, the Babylonians used a mechanical device called the "Chain of Pots" for watering the Hanging Gardens of Semiramis, [illegible] by Nebuchadnezzar II to please his Median [illegible], who longed for the hills of her native country.

Belt [illegible] we know them today, came along much, much later, and their development was almost unbelievably rapid. In fact, less than a generation ago, practically no belt conveyors existed underground in this country—yet today, underground coal mines are equipped with more than 300 miles of rubber belt transportation, with the potential need for at least this many more miles.

NOW TWO GREAT NAMES IN MATERIALS HANDLING COMBINED!

THOMAS TRUCK of Keokuk

announces the purchase of

THE LANHAM COMPANY of Louisville, Kentucky

LANHAM FOR LIFETIME

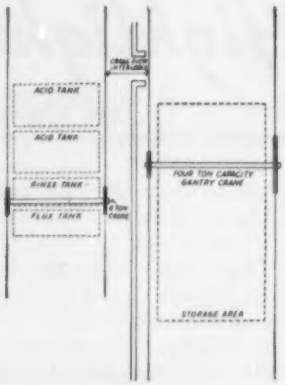
The addition of the famous LANHAM line of Skid Platforms, Skid Boxes and Allied products will enable THOMAS to offer a more complete service to their customers in the quality materials handling products field. The LANHAM name will be used in the marketing of these products and distribution will be continued by Lanham sales representatives throughout the country. THE LANHAM SKID CO. offices and production facilities are now located at Keokuk, Iowa.

THOMAS

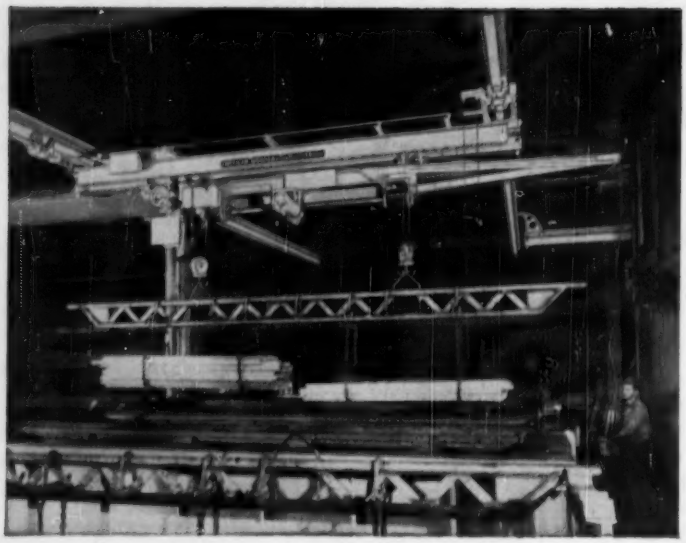
THOMAS TRUCK & CASTER CO.

571 MISSISSIPPI RIVER • KEOKUK, IOWA

Circle No. 182 on Reader Service Card for more information



AMERICAN MONORAIL GANTRY CRANE SYSTEM *speeds galvanizing!*



Steel fence posts travel from fabrication to galvanizing over a gantry bridge which interlocks at a crossover track through doorway for passage to the MonoRail crane serving the tanks in the plating room.

All travel on the 4-ton system is motor operated and controlled by push-button station in the operator's hand.

Here is truly team-work handling that results in cost savings as well as increased tonnage through the galvanizing process. It is a typical example of American MonoRail engineering available at no obligation for the solution of your handling problems.

Send for Bulletin C-1 illustrating hundreds of successful Mono-Rail installations.

AMERICAN OVERHEAD HANDLING EQUIPMENT

MONORAIL COMPANY

13129 ATHENS AVENUE • CLEVELAND 7, OHIO

Circle No. 11 on Reader Service Card for more information

We can CUT your Bulk Material Handling Cost

Let us prove . . . BY A DEMONSTRATION . . . the many advantages of loading with the combination of Clutch-Type Transmission and Hydraulic Torque Converter . . . brought to you by the

TRACTOMOTIVE TL-10 TRACTOLOADER

SEE how the smooth-operating HYDRAULIC TORQUE CONVERTER DRIVE speeds loading — no butting or ramming, no engine stalling. No clutching either — operator crowds steadily into pile using only the foot throttle and bucket control levers. Wheel spin is practically eliminated, tire wear greatly reduced. Bucket action is snappy at all times because speed of engine and hydraulic pump remain constant.

SEE how the specially designed CLUTCH-TYPE TRANSMISSION eliminates most shifting. You simply push a lever to go forward, pull it back for reverse. Reverse is almost twice as fast as forward.

SEE how easy it is to maneuver the TL-10. Bucket over drive wheels utilizes weight of load for greater traction...eases weight on rear steering wheels. Turning radius is only 11 ft. at tip of bucket . . . works in areas that would normally accommodate only lower capacity machines. You can turn from a 9-ft. aisle into a 10-ft. bin!

Only by watching the TL-10 work can you fully realize the great savings you can make on bulk material handling. Let us arrange a demonstration NOW! Wire, write or call.

Added Versatility Standard bucket is quickly interchangeable with Lift Fork, Crane Hook, Dozer Blade or a 1½-yd. Light Materials Bucket. Each conversion adds to usefulness of the TL-10.

Write to us — for literature on the TL-10 and see your nearest Allis-Chalmers Industrial Tractor Dealer.

Never-Anywhere— A WHEEL LOADER LIKE THIS!

¾ cu. yd. bucket — weight 11,400 lb. — 63 brake hp. Has dynamic, new Allis-Chalmers POWER-CRATER engine . . . gives you high-octane performance on regular gasoline.

POWER-CRATER is an Allis-Chalmers trademark.

TRACTOMOTIVE

TRACTOMOTIVE CORPORATION, DEERFIELD, ILLINOIS

Tracto-Loaders • Tracto-Shovels, Side Booms and Hydraulic Rippers for Allis-Chalmers Crawler Tractors • Loader and Shoulder Maintainer for Allis-Chalmers "D" Motor Grader

Circle No. 149 on Reader Service Card

NEWS VIEWS TRENDS

TWO GAYLORD DIVISIONS FORMED

The Fairfield Paper and Container Company, Baltimore, Ohio, and The Dresden Paper Mills Company, Dresden, Ohio, wholly-owned subsidiaries of Gaylord Container Corporation, have merged with the parent Company. They will be known as the Fairfield and Dresden Divisions of Gaylord, according to Edwin J. Spiegel, company president.

COLLEGE-INDUSTRY FILM AVAILABLE

The College-Industry Committee on material handling education has completed a 16 mm sound educational film on powered industrial trucks. The 1000 foot long, black and white film shows the development, types and uses of trucks. The committee, whose purpose is to encourage the teaching of material handling subjects and to develop better teaching material, is composed of eight college professors, four manufacturing executives and four user executives. It is sponsored by the Material Handling Institute.

GLOBE BELTING TESTS SYNTHETICS

A $150,000 research and engineering laboratory was recently completed in Buffalo, New York by Globe Woven Belting Company, Inc. Synthetic fibers of all types which can be applied to belting for conveying, elevating or transmission of power, are undergoing tests in the 7,000 square foot building.

GENERAL BOX BUILDS NEW PLANT

The first step in General Box Company's program for expanding operations in the corrugated box field is the construction at Louisville, Kentucky, of a modern corrugated box factory now nearing completion. Costing $800,000, the factory will be capable of supplying 30,000,000 square feet of corrugated board per month, according to William C. Embry, vice president of General Box Company and general manager of the company's Louisville corrugated plant.

CANNING FUTURAMA

Theme for the 48th annual exhibit of the Canning Machinery and Supplies Association will be "Futurama—See The Tomorrow of Canning Today". The exhibit will be held in connection with the National Canners Association Convention in Chicago, February 19-23.

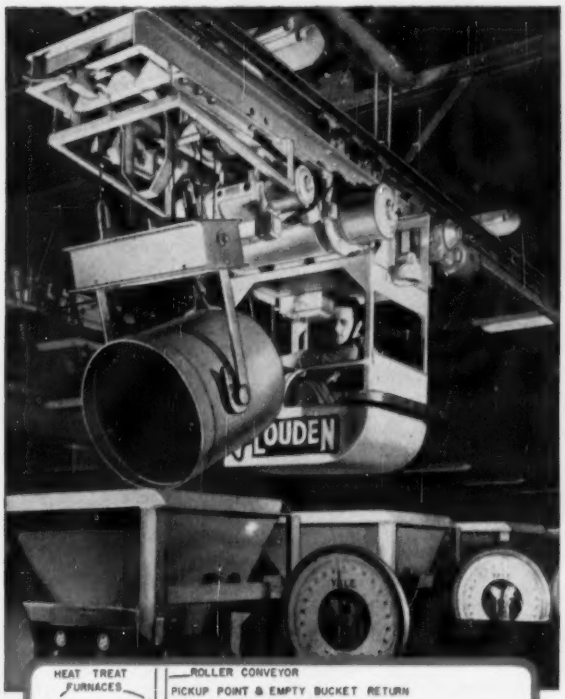
LONDON STAGES PACKAGING SHOW

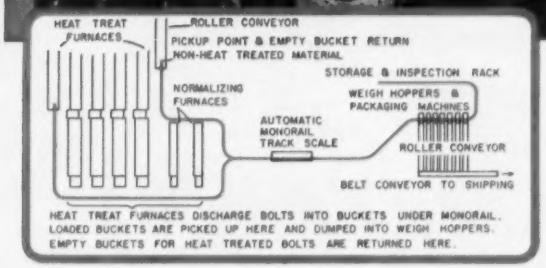
All space has been allocated in both the National and Empire Halls, Olympia, London, for Britain's 4th International Packaging Exhibition. An event of January 18-28, it is expected to be the largest and most comprehensive packaging exhibition yet staged.

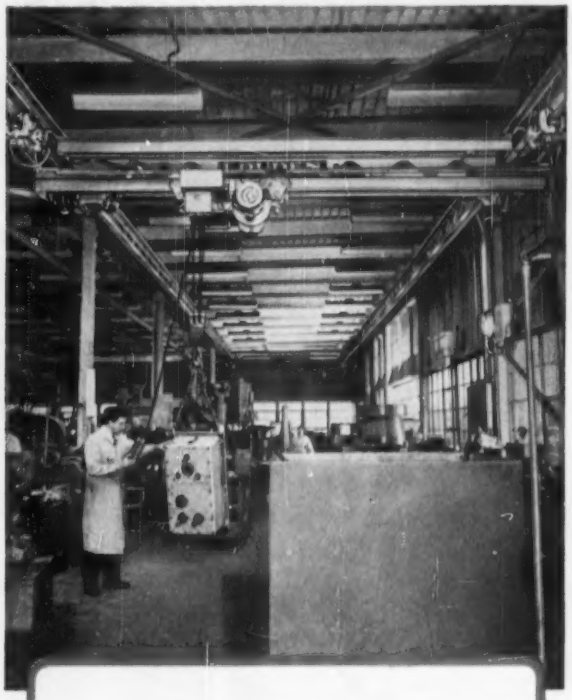
SOFT DRINK EXPO

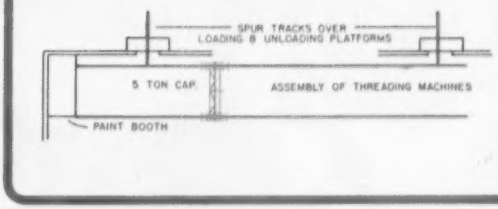
The International Soft Drink Exposition to be held in Philadelphia, November 15-18, is expected to attract an attendance of more than 7,000. Two sections of Philadelphia's convention hall have been sold out, and it is expected that the number of exhibitors will far exceed the 200 already signed.

Parts for packaging or components for assembly?




HEAT TREAT FURNACES
ROLLER CONVEYOR
PICKUP POINT & EMPTY BUCKET RETURN
NON-HEAT TREATED MATERIAL
STORAGE & INSPECTION RACK
NORMALIZING FURNACES
WEIGH HOPPERS & PACKAGING MACHINES
AUTOMATIC MONORAIL TRACK SCALE
ROLLER CONVEYOR
BELT CONVEYOR TO SHIPPING
HEAT TREAT FURNACES DISCHARGE BOLTS INTO BUCKETS UNDER MONORAIL. LOADED BUCKETS ARE PICKED UP HERE AND DUMPED INTO WEIGH HOPPERS. EMPTY BUCKETS FOR HEAT TREATED BOLTS ARE RETURNED HERE.





Louden engineered overhead handling speeds and saves in many ways

Many plant executives have found a broad avenue to savings and production increases in Louden engineered Monorail and Crane systems . . . products of the longest overhead handling experience.

Above, left, a Louden cab-controlled carrier conveys heat-treated parts from furnaces to packaging machine hoppers. With handling overhead, furnaces are grouped closer together. Rehandling is eliminated. Machine non-productive time is cut. Much the same is true of the installation shown at the right where a Louden 5-ton crane is handling a component for final assembly in a screw thread machine factory.

Let Louden's long experience and complete line of equipment bring you the best solution to your handling problems.

THE LOUDEN MACHINERY COMPANY
4310 Broadway, Fairfield, Iowa
A Subsidiary of Mechanical Handling Systems, Inc.

SEND FOR THIS BOOK— Write for your copy of "Economical Material Handling" . . . full of time-saving, cost-cutting ideas and case histories. Free . . . no obligation.

Louden
MONORAIL & CRANES

Since 1867—the first name in materials handling

Circle No. 188 on Reader Service Card for more information

RAYMOND

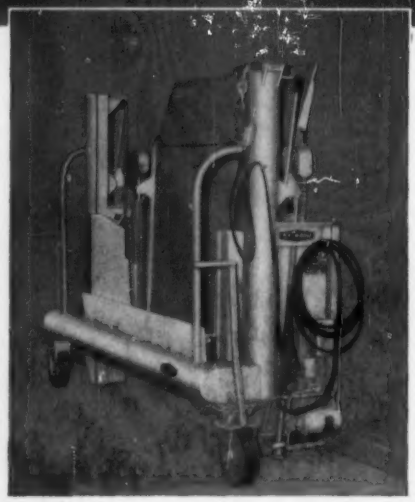
Porta-dock* loads and

TRADE MARK

ANOTHER RAYMOND FIRST!

1. Incoming shipment is drawn from motor truck onto Porta-Dock's elevating platform by hand truck.

• **THIS PORTABLE DOCK** handles loads weighing up to 6,000 lbs., elevates from the floor up to 56 5/16". Powered by a 1½ HP motor-driven hydraulic pumping unit which plugs into any convenient outlet. Also available battery powered. Has push button elevating and lowering controls that can be operated from floor or platform. The unit may be used indoors or outdoors, folds compactly for storage when not in use.



PortaDock folds up compactly for storage so that it may be rolled out of the way when not in use.

*Patent applied for

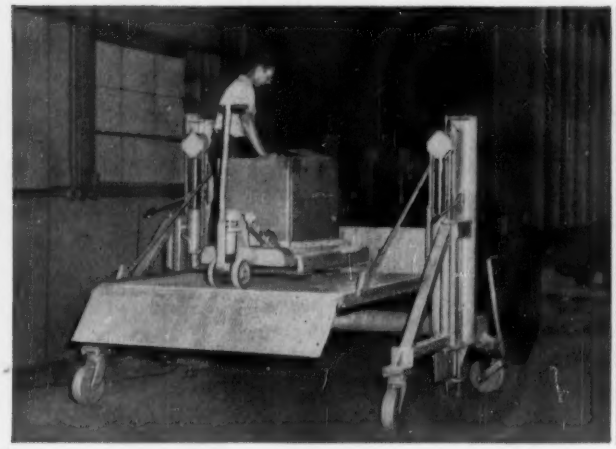
unloads trucks at ground level

—no loading docks needed!

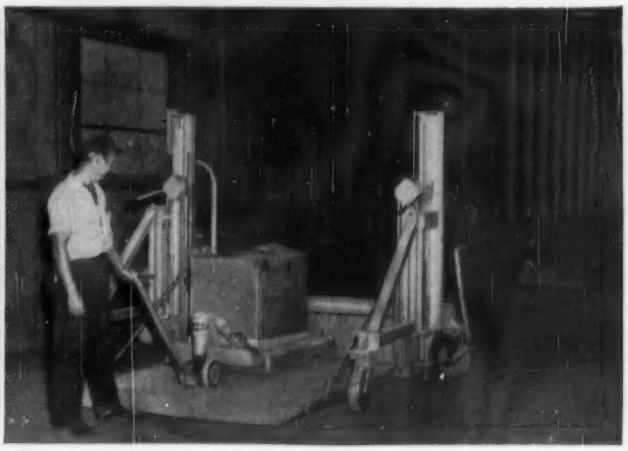
GOOD NEWS...

Now you can load and unload motor trucks from ground level with the RAYMOND PortaDock. This new portable dock actually eliminates the need for permanent loading docks, elevators or truck wells. Ideal for use by factories, warehouses, wholesale distributors, retail stores.

RAYMOND PortaDock rolls easily right up to the tailgate of any over-the-road truck. An industrial truck is then run onto elevating platform and raised to the level of the motor truck bed. Unit loads are transferred to the elevating platform, lowered to the floor and transported to production or storage.



2. Hand truck and load being lowered to floor by hydraulic-operated PortaDock.



3. Incoming load is taken off PortaDock for transporting to production or storage area.

WRITE FOR BULLETIN describing the new RAYMOND PortaDock—it gives you full details. Fill in and mail the coupon now.

RAYMOND

ELECTRIC INDUSTRIAL TRUCKS

HYDRAULIC ELEVATING EQUIPMENT

The RAYMOND CORPORATION

3345 Madison St., Greene, N.Y.

Please send Bulletin on your new Portable Loading Dock.

NAME _____ TITLE _____

COMPANY _____

STREET _____

CITY _____ STATE _____

Circle No. 179 on Reader Service Card for more information

Continued

NORTHERN ENGINEERING EXPANDS

A 20,000 square foot building expansion by Northern Engineering Works, Detroit, was recently completed. Facilities of the 50 year old company provide for complete machining, fabricating, welding and electrical departments. Sales offices are located in major industrial centers throughout the country.

MICHIGAN STATE CONFERENCE SUCCESS

The 6th annual Industrial Engineering Conference, held September 13-17 at Michigan State College, was termed highly successful by speakers and attendants alike. Various phases of material handling were discussed by a staff of more than 30 qualified persons from business, industry and education. Conference chairman was James M. Apple, Industrial Engineering Professor.

ALL SIZE MODELS

"Visual" Plant Layouts Inc., Oakmont, Pennsylvania, has announced a new service division which will specialize in machine and product models in various scales up to life size. The service is slanted at the design, pre-manufacture and sales demonstration fields. Exactly scaled from design prints, the models are expected to aid engineers, designers and customers in visualizing the final product.

WEST NOW GETS PROMPT DELIVERIES

National Vulcanized Fibre Company has opened stock warehouses in San Francisco and Los Angeles, California, to give immediate delivery of its line of equipment to western industry. Factory-trained material handling men will be available at the firm's west coast offices for consultation.

NEW RAIL SEALING RULE

The Gummed Industries Association, Inc. is publicizing the new rule which governs the sealing of cartons being shipped by rail. It calls for both tear resistance and tensile test requirements, rather than the former method which was based solely upon the Mullen test, and conforms with Federal Government Specification UU-T-11b covering gummed sealing tape.

CATERPILLAR PLANS EXPANSION

Plans for construction of a new plant, at a location not yet determined, were announced by Louis B. Neumiller, president of Caterpillar Tractor Co. The new plant, occupying 700,000 square feet of manufacturing floor space, will be devoted to the production of the company's line of motor graders and industrial wheel tractors. The move is being made to accommodate at Peoria a broadened program of crawler tractor and diesel engine manufacture.

NAME CHANGE

The U. S. Engineering Corporation of Milwaukee has announced a change in its name to Jorgensen Conveyors, Inc. A new plant, now in the designing stage, will house production of component conveyor parts, including conveyor chain, fabricated welded steel items, standard shop trucks and allied material handling equipment.

NOW!

KENNETT materials handling equipment is stocked on the west coast...

Here's big news for West Coast industry! The famous Kennett line of specialized materials handling equipment is being warehoused at San Francisco and Los Angeles. It's now readily available—at new lower costs—for users throughout the growing industrial West.

Kennett, the sturdy line of hard vulcanized fibre equipment, is light in weight, smooth, hard, strong, and built to last! Many individual units answer different needs in various industries. Let Kennett answer *your* materials handling requirements!

A NEW FREE CATALOG

Write, phone or wire your nearby Fibre Specialty representative for this handy guide to the Kennett Line.

FIBRE SPECIALTY DIVISION
NATIONAL VULCANIZED FIBRE CO.

WILMINGTON 99 DELAWARE

In the West

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TRUCKS • TOTE BOXES • TRAYS • BAKERBOY BASKETS • UTILITY RECEPTACLES • BARRELS • ROVING CANS • DOLLY TRUCKS

Circle No. 71 on Reader Service Card for more information

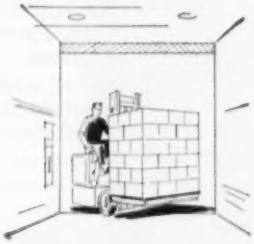
Built to absorb

OTIS HEAVY DUTY FREIGHT ELEVATORS

"PUNISHMENT"

ARE DESIGNED FOR POWER TRUCK LOADING

You've got to change your thinking about freight elevators — *when you change to industrial power truck loading!* A power truck, which may weigh 8,000 pounds or more, plus its heavy pay load, sets up unusually severe off-balance, extra static loading, and heavy impact forces in the elevator car and structure.

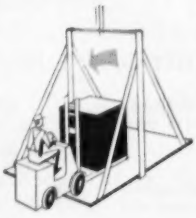


Let's examine this "punishment" in detail to see why an elevator for industrial power truck loading must be extremely rugged to stand up under these forces.

Let's start with

...OFF-BALANCE LOADING

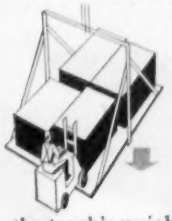
As a power truck enters the car, it suddenly concentrates most of its weight and all of its pay load at the front edge of the platform. Then it usually deposits its first heavy pay load at a rear corner of the platform.



This off-balance loading "punishment" is transmitted to the car, the rails and brackets, the elevator shaft, and finally to the building structure. All of these forces must be met with increased ruggedness of design.

Now for

...EXTRA STATIC LOADING



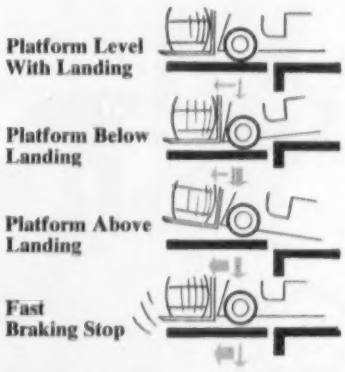
Watch the front wheels of a power truck as it deposits its final pay load. They usually stop at the front edge of the car platform. This adds up to 80% of the truck's weight to the load the elevator must withstand — which may be as high as 50% over the lifting capacity of the elevator.

This extra static loading "punishment" must be met with increased ruggedness of design.

Finally, there's

...IMPACT LOADING

Industrial power trucks travel fast, stop quickly, and deliver freight with heavy impact. They tend to tilt and twist the entire elevator structure with a variety of vertical and horizontal impact forces. See weight of the arrows in diagrams.



Impact "punishment" must be met with increased ruggedness of design. All of the forces described are at work, not singly, but simultaneously and in endless combinations.

Otis POW-R-TRUCK elevators with power-operated doors—*and lifting capacities from 8,000 lbs. up*—have the ruggedness of design, automatic controls, and traditional Otis safety needed for today's power truck loading. Write for Booklet B-705 or ask any of our 268 offices for details.

Otis Elevator Company
260 11th Ave., New York 1, N. Y.

Otis FREIGHT ELEVATORS

HEAVY DUTY · GENERAL DUTY · LIGHT DUTY

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Look at all the features

that are built right into the

PALITON

Combined handle and pump lever
Hydraulic Cylinder easily serviced
Control Valve for raise, lower and neutral
Rubber or Steel tyres
Light, compact, sturdy frame
Twin rollers for easy cornering
Rollers retract into forks
Optional fork lengths

★ Fast-acting hydraulic pump; full five-inch lift ensures smooth travel over rough, uneven surfaces.

★ Twin front wheels and two rollers per fork for high maneuverability.

★ Two ball bearings in each wheel and roller: massive ball bearings on steering swivel.

★ Overloading prevented by factory-set relief valve.

★ Hard chrome faced pump piston with protective shield for long life.

★ Rubber or steel tires optional.

★ Quick and easy detachment of hydraulic unit for service or replacement.

★ Pressed steel reinforced forks for high strength.

★ Capacities—3,600 lb. and 4,600 lb.

★ Fork lengths—36", 42", 48".

★ Width over forks 20½" - 27".

● THREE WAY FOOT CONTROL FOR RAISE-LOWER AND NEUTRAL, GIVING A FREE HANDLE FOR TOWING.

● Model illustrated, has been produced to meet universal demand for a pallet truck of high quality and modest cost. It is designed for the simplicity and strength that guarantee long life and trouble-free service.

NOTE THE VERSATILITY OF THE PALITON

Handling pallet loads of heavy parts and components.

Unloading shipments from highway and rail trucks.

Easily maneuvered for maximum space utilization.

Ease of handling with full loads preventing bottlenecks.

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c/o CONVEYANCER, **18 Ingram Drive at Keele Street, P.O. Box 14, Station D, Toronto, Ont., Cherry 1-1551**

NEW YORK OFFICE:

PALITON, Inc., **40 West 29th St., New York 1, N.Y., Murray Hill 5-9323**

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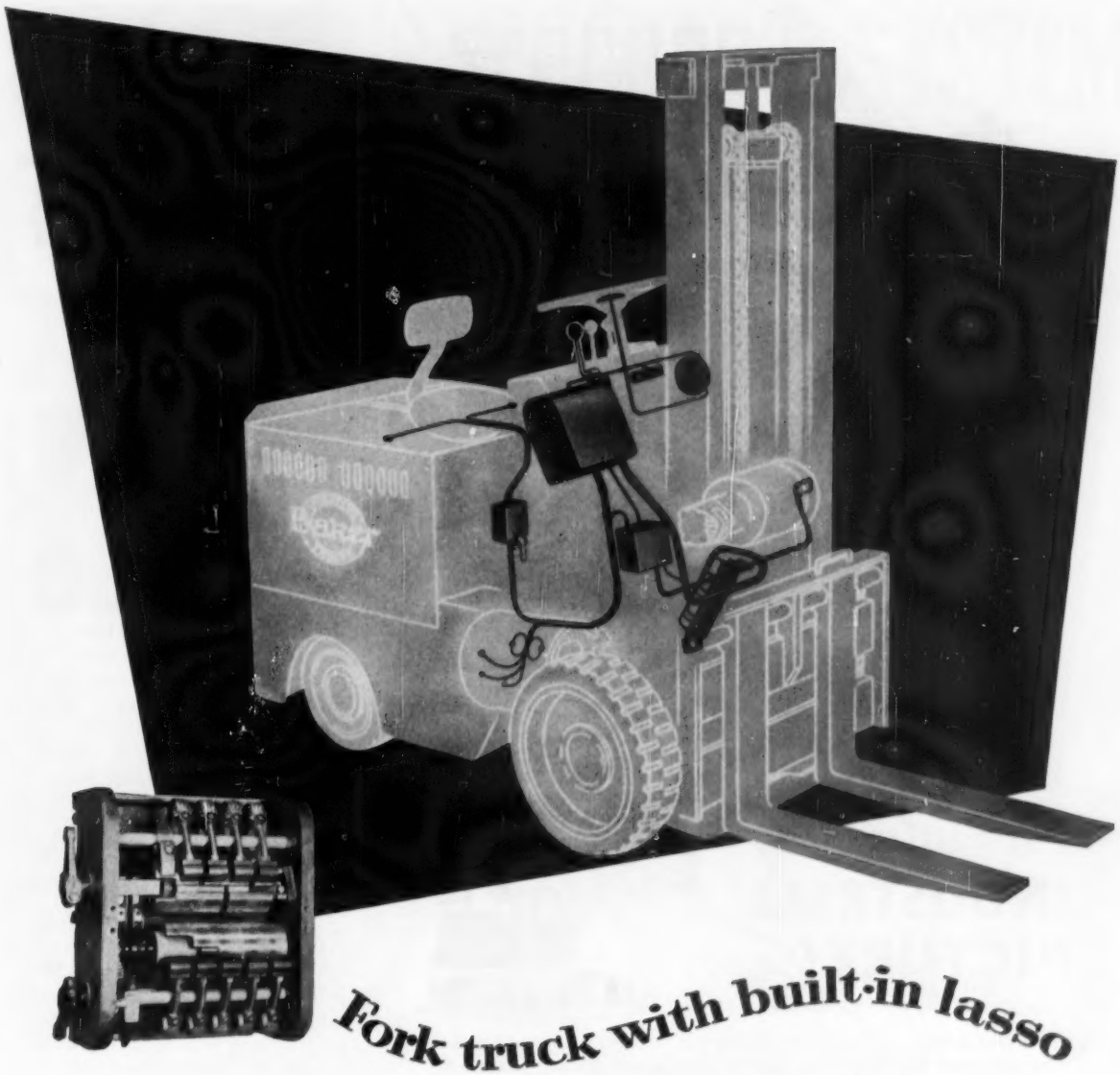


Fork truck with built-in lasso ... for cowboy drivers

● Over-enthusiastic truck jockeys can't hurt Baker Fork Trucks or loads carried (or themselves) by jumping from "low" to "high" or forward to reverse.

Baker drum-type controllers take motor speed in successive steps through acceleration stages, no matter how "heavy" the foot on the accelerator.

Jack-rabbit starts, with resulting motor burnouts, are impossible. Dynamic braking slows truck to a smooth stop, sparing driver and load, and acts as auxiliary brake on steep grades.

Motor strain or jolt from sudden direction changes is prevented by requiring truck to come to a virtual stop before reversing circuit applies.

All this adds up to safer operation for driver, truck and load, less down time, lower repair bills and longer truck life.

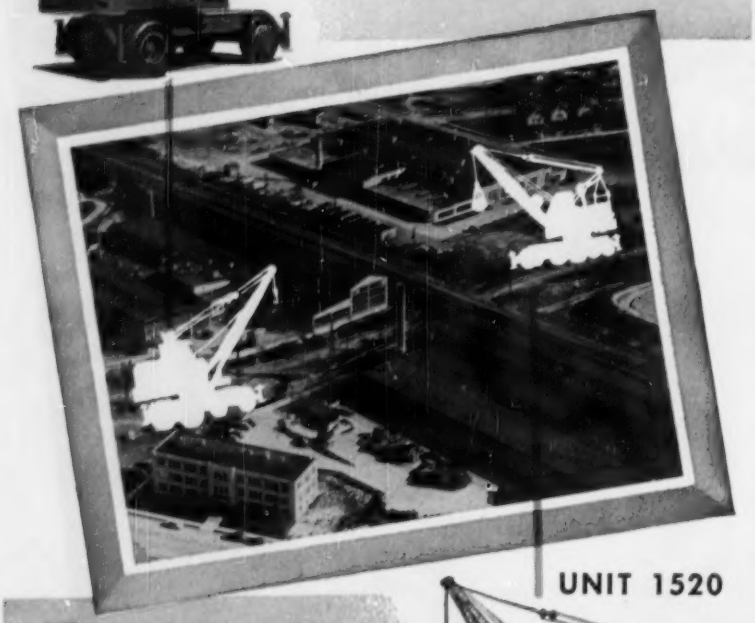
For more detailed information on Baker Fork Truck features, write for 4-color sketch book —Bulletin 64. The BAKER-RAULANG Company, 1219 West 80th Street, Cleveland 2, Ohio.

Baker.
industrial trucks

Circle No. 24 on Reader Service Card for more information

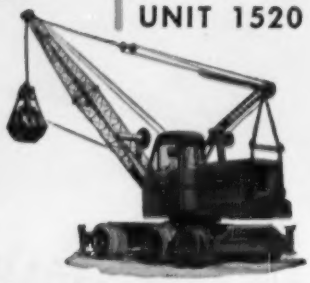
UNIT 357

UNIT
Self-Propelled Mobile Crane



UNIT 1520

Fits into Any INDUSTRIAL PICTURE!



You'll find a UNIT Mobile Crane is just the machine you need for the many material handling jobs around your plant. It's self-propelled, rides on rubber, travels anywhere. It has 1001 uses, in and out of yard. Works efficiently even in small yards where space is limited. Controlled and operated by ONE man. Powered by ONE engine. Balanced weight distribution in upper structure adds full-length stability to undercarriage. Provides full-circle, fast-cycle operation. Easy hydraulic steering. Streamlined, FULL-VISION Cab gives operator complete visibility in ALL directions. Promotes safety. Investigate these Mobile Units!

UNIT 357 — Versatile, compact, lightweight Mobile Crane, ideal for your yard lifting and loading jobs. The smoothest operating and easiest handling crane on the market. Mounted on 6 pneumatic tires, duals on rear. Capacity 10 tons. Ask for Catalog L-301.

UNIT 1520 — Heavy-duty, self-propelled Mobile Crane — another UNIT advancement in modern, high-speed, rubber-tired equipment. Lifting capacity up to 20 tons. Mounted on 12 pneumatic tires, with duals on steering axle and tandem rear axles. Ample power for the toughest jobs. Ask for Catalog 502.

UNIT CRANE & SHOVEL CORP., 6531 W. Burnham St., Milwaukee 14, Wis., U.S.A.

Crawler and Mobile models — ½ and ¾ Yd. Excavators. Cranes up to 20 tons capacity.

UNIT

SHOVELS • DRAGLINES • CLAMSHELLS • CRANES • TRENCHERS • MAGNETS

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MEN in the news

. . . at The Colson Corp.

Edward C. Hamm has been named vice president and director of sales. Since 1946 Hamm has been president and general manager of the Service Caster & Truck Corporation, which he helped organize. Prior to that he served for 25 years in various executive capacities with Signode Steel Strapping Company, and over a period of years was in charge of that company's sales organization.

E. C. Hamm

. . . at Mechanical Handling Systems, Inc.

Package handling division sales manager is **Clifton W. Johnson.** He holds an engineering degree from Lehigh University, and was formerly with American Machine and Metals, Inc.

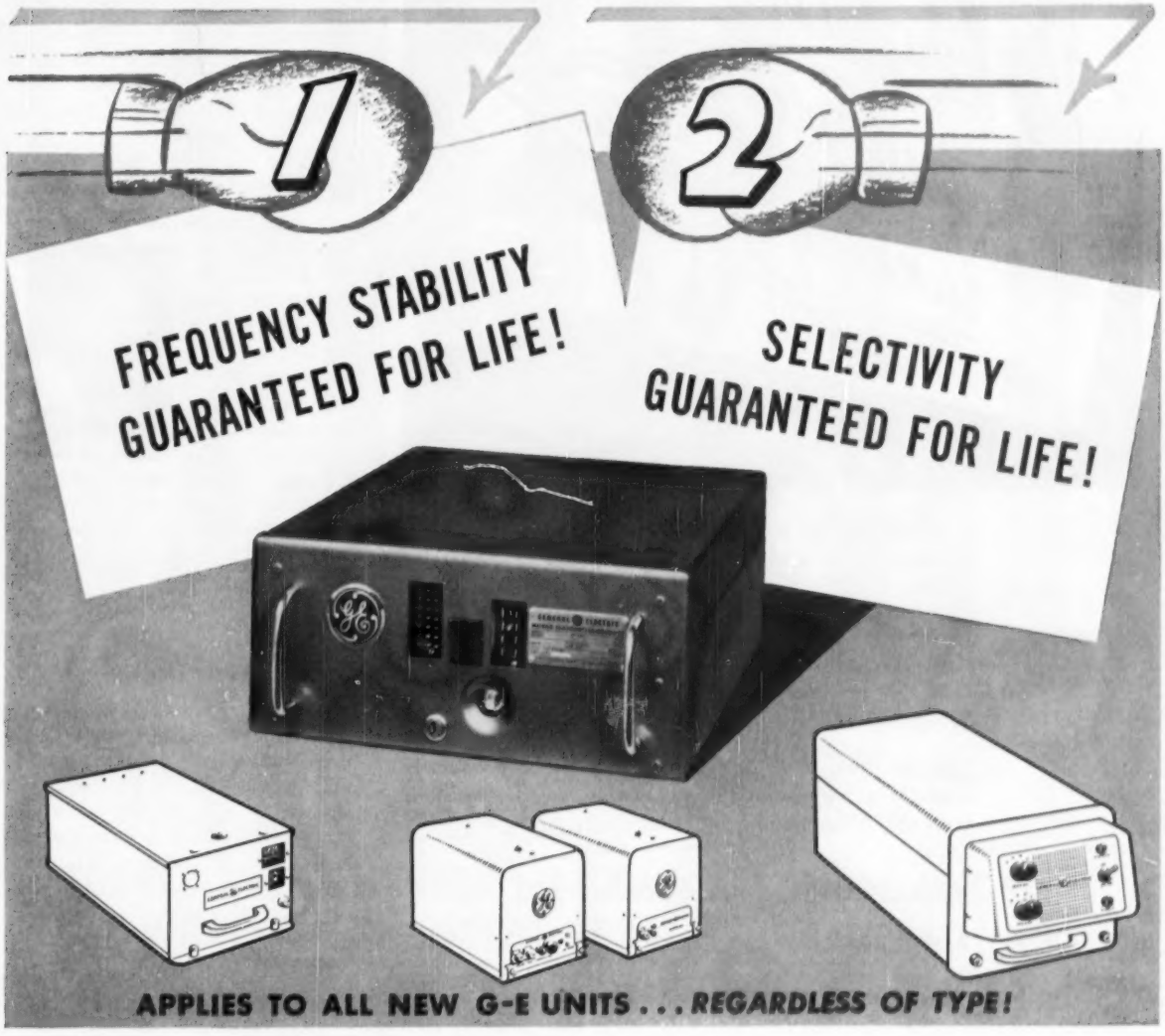
. . . at Hyster Company

Lewis W. Krumbein has been named coordinator of lift truck promotion and Richard M. Taylor head of market research. Both men are graduates of Oregon State College.

. . . at H. K. Porter Company, Inc.

Announcement of the appointment of **L. Jack Clark** as general sales manager, Leschen Wire Rope Division, was made by vice president **D. W. Vernon.** Clark has served the Les-

GIVE YOUR 2-WAY RADIO SYSTEM


1
2
FREQUENCY STABILITY GUARANTEED FOR LIFE!
SELECTIVITY GUARANTEED FOR LIFE!
APPLIES TO ALL NEW G-E UNITS . . . REGARDLESS OF TYPE!

2-WAY MOBILE RADIO

HERE . . . and *only from General Electric* . . . you have today's most potent influence on mobile radio design. G.E. guarantees protection from two major causes of unpredictable 2-way radio performance!

Guaranteed Selectivity with new multi-coil IF transformers guards your system against interference 24 hours a day! *Guaranteed Frequency Stability* clearly interprets the superior value of G-E crystals. Both, go the lifetime limit!

Printed space just can't tell the whole story. You'll want it firsthand, so pick up the phone now . . . call the G-E Communications Counselor at a local sales office. Or, write to: *Section X32104, General Electric Co., Electronics Park, Syracuse, N.Y.*

Progress Is Our Most Important Product

GENERAL ELECTRIC

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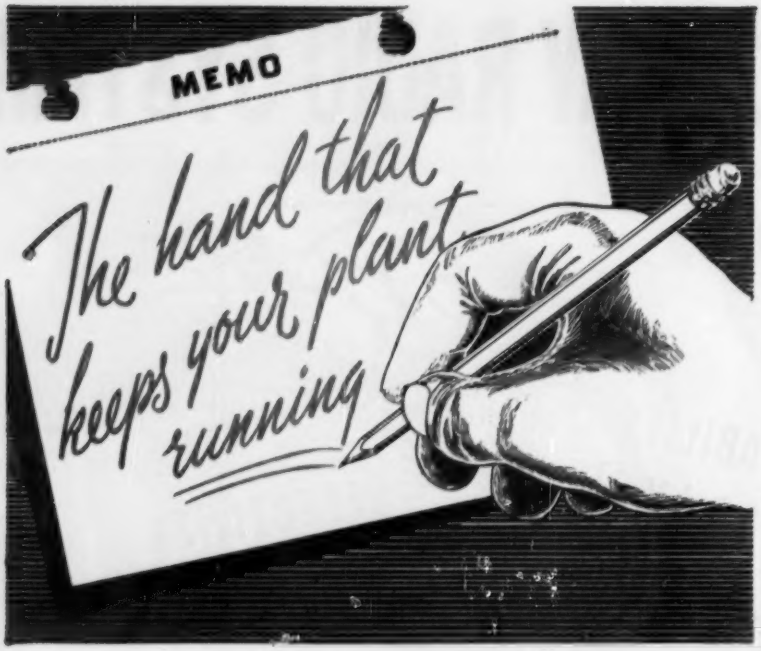

. . . can also be the hand that keeps your costs from skyrocketing — merely by making a note to use Globe Belting.

Frankly, we do not claim to have one particular belt that answers the need for **every** installation. But we are sure that in Globe's complete line you will find the "right" belting for **any** particular job.

The one thing you will find in **every** Globe product is superior quality. That's why you shouldn't be satisfied with **any** other belting.

- SOLID WOVEN WHITE COTTON BELTING
- STITCHED CANVAS BELTING
- KANRY-TEX BELTING
- WOVEN ENDLESS BELTS — COTTON OR NYLON
- WHITE OR BROWN NEOPRENE RUBBER BELTING
- PLASCELL BELTING, PLASTIC COVERED
- INDUSTRIAL WEBBINGS

Before Selecting Your Next Belt Look into Globe's complete line of products. Write for complete catalog and free samples. Dept. G.

GLOBE WOVEN BELTING CO., INC.
1400 CLINTON STREET • BUFFALO 6, NEW YORK
KNOWN FOR QUALITY THE WORLD OVER

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MEN IN THE NEWS

Continued

chen organization as field representative in the New Orleans area and as manager of the New York sales district. He will headquarter in St. Louis.

. . . at Unistrut Products Co.

Newly appointed executive vice president is **Ralph R. Butler.** He was previously vice president of the Unistrut Eastern Sales Division. Butler has been with the Chicago manufacturer for nine years, interrupted by four years' service with the U. S. Navy as a lieutenant commander.

Ralph R. Butler

. . . at General Box Company

James F. Ferguson, vice president and sales manager, died suddenly of a heart attack on August 12. He was widely known in the packaging and material handling field and was active in the affairs of the Wirebound Box Manufacturers Association.

. . . at Ideal Stencil Machine Co.

New president is **Clarence E. Rapp.** He has spent the past 30 years with Ideal, serving in various capacities, and has served as vice president since 1948.

. . . at Rheem Manufacturing Co.

Gripper Arm sales manager is **Nelson L. Hammell,** former national accounts sales manager for Hyster Company. Prior to that time he was associated with George Malvese and Company. He now serves as program chairman of the New York chapter of AMHS.

SERVICE

- materials handling specialists
- field maintenance service
- factory-trained mechanics
- precision rebuilding
- complete parts stock

BEHIND EVERY HYSTER LIFT TRUCK STANDS ONE OF THE WORLD'S STRONGEST SERVICE ORGANIZATIONS

SERVICE is a big word with every Hyster Dealer. SERVICE is a big word from the first day he opens his doors for your business. In fact, his qualifications as a Hyster Dealer hinge strongly upon the caliber of SERVICE he is set up to render to Hyster Industrial Truck owners and operators.

Your Hyster Dealer carries a complete stock of parts, and offers an efficient field service—your assurance that your job will keep moving, wherever it is. Besides parts stock, your Hyster Dealer has shop facilities for precision rebuilding by experienced mechanics.

It is this combination of *services* that makes "every Hyster Dealer a Lift Truck SERVICE Station". It is your Hyster Dealer's responsibility to furnish prompt, efficient service—and parts at a reasonable cost, *wherever you are* (and there are over 350 locations around the world). If you are not acquainted with your Hyster Dealer, send for Catalog 2931.

THERE'S PROFIT IN **HYSTER POWER**

A Complete Line of New and Used Industrial Trucks 1,000-30,000 lbs.

HYSTER COMPANY

2931 N. E. CLACKAMAS STREET.....PORTLAND 8, OREGON
1031 MYERS STREET.....DANVILLE, ILLINOIS
HYSTER N.V. .....NIJMEGEN, THE NETHERLANDS

Four Factories: Portland, Oregon; Danville, Illinois; Peoria, Illinois; Nijmegen, The Netherlands

HYSTER

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diesel or gasoline power

in OLIVER'S *new Super 55*

most powerful tractor of its type!

Two husky overhead valve Super 55 engines to choose from! Pick the fuel that fits your needs the best, cuts your costs the most.

The diesel is a *full* diesel—starts and runs on diesel fuel alone. An engine rugged and responsive, and one that takes little upkeep. And this diesel is weatherproof—easy to start even after long layups.

Pick the gasoline, and you get an engine with a compression ratio of 7.0 to 1—highest for an industrial tractor! Extra high compression means greater power on less fuel, better performance on every job.

See this new Oliver, drive it yourself! Check its power, handling qualities and many attachments. Check, too, its many standard features—6 forward speeds, double-disc brakes, ball-type steering. See your Oliver Industrial Distributor, soon!

THE OLIVER CORPORATION

400 West Madison Street, Chicago 6, Illinois

a complete line of industrial wheel and crawler tractors

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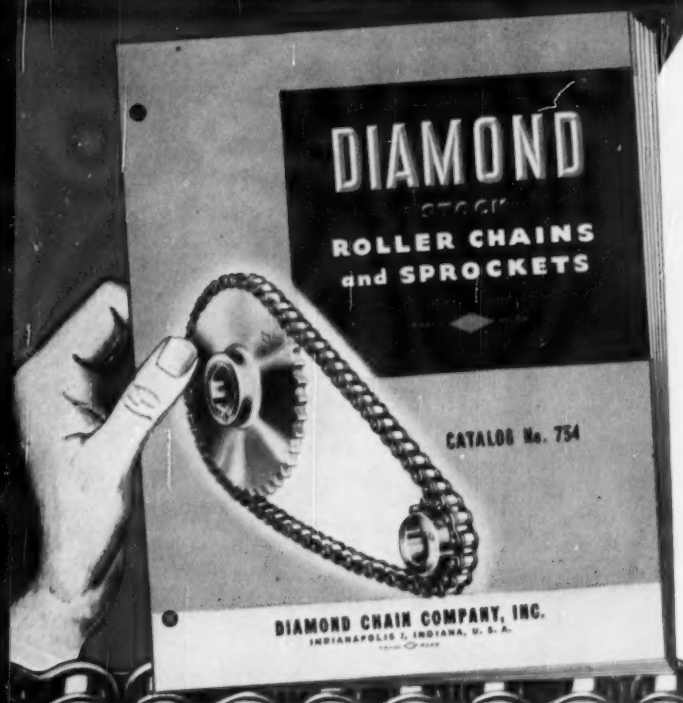


Here's the Very Latest on Roller Chains 64 Pages of Important Data and Information

DIAMOND *Stock* ROLLER CHAINS AND SPROCKETS

● In this new complete catalog are data and information compiled by our engineering department—information based on 65 years of experience in the production and application of Roller Chains and Sprockets for power drives, secondary drives, timing, lifting, conveying, coordination of several machinery functions, etc.

A CONSTANT HELP— A READY REFERENCE

Here is a compact source of information and data on stock Roller Chains and Sprockets. Engineers and production men will find this comprehensive 64-page Catalog 754 is a time-saver in selection and correct application. Write today, or mail the coupon for a copy.

DIAMOND CHAIN COMPANY, Inc.
De ... G...
Offices and Distributors in All Principal Cities

Please refer to the classified section of your local telephone directory under the heading CHAINS or CHAINS-ROLLER

DIAMOND ROLLER CHAINS

Circle No. 170 on Reader Service Card

Check these IMPORTANT SUBJECTS IN NEW CATALOG 754

- ✓ Selecting a STOCK Roller Chain Drive
- ✓ Chain Length Calculations with ready-to-use Tables
- ✓ Installation Recommendations
- ✓ Table of Speed Ratios for Sprocket Combinations
- ✓ Single and Multiple Strand Chain Weights, Tensile Strengths, and Prices
- ✓ Sprockets for Reboring, Stock Finished-Bore and Taper-Bushed Sprockets.
- ✓ Tables for Easy Sprocket Selection, Chains of All Pitches
- ✓ Stainless Steel and Bronze Chains
- ✓ Flexible Shaft Coupling Selection
- ✓ Double Pitch Chains

CLIP COUPON AND MAIL TODAY!

Diamond Chain Company, Inc.
Dept. 624, 402 Kentucky Ave.
Indianapolis 7, Ind.

Please mail a copy of your New Catalog 754 to:

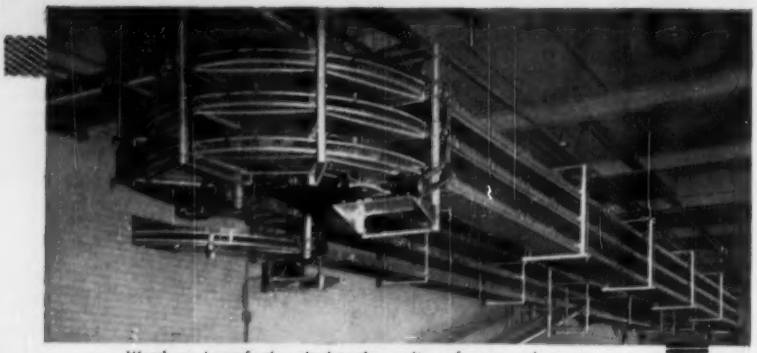
Name_____

Firm Name_____

Address_____

City_____ Zone_____ State_____

WENDWAY
LIGHT PRODUCT CONVEYORS



Wendway is perfectly suited to the cooling of raw products, packages or containers. This "spiral" system travels the cooling products at ceiling height to conserve valuable floor space.

Cut Handling Costs!

Wendway is the modern, light product conveying system that delivers your product to any place you want it . . . smoothly and silently. Through the wall, upstairs or down, all around the plant. Wendway turns corners, goes down the assembly, packing or shipping room line, or back again, in single file or multiple tiers, runs fast or slow, or switch tracks to another part of the plant. Wendway is really *versatile!* And . . . Wendway saves you money in space, handling costs, convenience and time. It's trouble-free and easy to maintain. Investigate the many Wendway advantages for light product conveying, then see for yourself the many places you could benefit through Wendway's versatility.

This simple, single-tier Wendway system is used to convey fancy packaged nuts from bag loaders through a series of stapling machines and then on to boxing stations.

As fresh sliced cold meat travel by on the Wendway conveying system, the operator labels each type as they proceed to the automatic package wrapping machine.

A typical package conveyor installation, this three-tier Wendway system extends the full length of the shipping dock and carries a steady flow of packages to the waiting trucks.

WRITE TODAY

Gentlemen:—

Please send me complete information about Wendway Conveyor systems as they apply to_____

Name_____

Company_____

Street_____

City_____ Zone____ State_____

Have a USP Conveyor Engineer contact me at once____ ☐

USP

UNION STEEL PRODUCTS CO.

ALBION, MICHIGAN

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association and society NEWS

• **October 14 and 15** are the dates set for the annual Midwest Regional Management Conference of the Milwaukee chapter of the Society for the Advancement of Management. Theme of the conference is "Techniques for Stretching Your Managerial Dollar".

• **A special industry address,** "The Future of Conveyor Equipment", was presented by Otto Svoboda of the E. W. Buschman Company at the fall meeting of the Material Handling Institute, Inc. The meeting was held at Skytop, Pennsylvania, September 22-24.

• **Robert H. Davies,** vice president of Clark Equipment Company, has been named chairman of the committee to direct the Material Handling Institute's activities for the 1956 Material Handling Exposition in Cleveland. Proceeds of the exposition will be used to finance educational programs for the industry.

• **National AMHS secretary,** J. Wellington Hall, acted as "referee" for the question and answer program of the New Jersey AMHS chapter, September 15. The program, formally titled "Taura-boleum", was planned as an ice-breaker to open the chapter's meetings for the 1954-55 year.

• **Market development and research projects** formed the major subjects discussed at the annual mid-summer meeting of the National Wooden Box Association held July 12-13 at Sun

Valley, Idaho. Industry representatives were present from all major areas. Directors of the association went on record as endorsing the association's present market development program and recommending expansion of activities when 1955 plans are formulated.

• **"Communications" was the subject** under discussion at the initial fall meeting of the AMHS Falls Cities Chapter. The meeting was held at the Kentucky Hotel in Louisville.

• **The 22nd annual meeting** of the Packaging Machinery Manufacturers Institute was held at Grove Park Inn, Asheville, North Carolina, September 11-14. Program chairmen were Frank Zimmerman and R. L. Sears of the Lynch Corporation.

• **More than 2000 production executives** and methods engineers are expected to attend the 18th Annual Time and Motion Study and Management Clinic sponsored by the Industrial Management Society scheduled November 10-12 at the Sherman Hotel in Chicago. Thirty leading authorities from management, labor and industry will discuss the latest developments in the fields of time study, motion economy, job evaluation, methods, plant layout, incentives and human relations. In addition to the technical sessions, an industrial exhibit will be held featuring new products, processes and services applicable to the industrial engineering field.

• **The Premier of Quebec,** Maurice Duplessis, will speak at the luncheon session of the 7th Quebec Regional Conference of the Packaging Association of Canada in Montreal, October 18. The conference will be devoted to a discussion of the various aspects of the packaging industry, which is now a $750,000,000 business in Canada.

A SURE CURE FOR A— — — — — HANDLING HEADACHE!

Greater space savings were effected by placing stacked warehouse Palletainers at 45° angle on aisle. Contents always visible — easier lift truck access.

Compact storage of "empties" is facilitated by Palletainer "fold-flat" feature. Leg arrangement permits safer, faster 8-way truck entry.

Easy stock selection is one of the outstanding features of the USP warehouse type Palletainer. Half-drop, hinged end gate makes stocks accessible while units are stacked. Gates lock securely for transport

Warehousing small parts in large quantities . . . causing a handling headache? USP Palletainers are the most practical, economical solution for achieving better space utilization plus efficient handling.

Specifically . . . USP Palletainers of the warehouse type offer you unknown versatilities for maintaining warehouse stocks, convenient — always visible contents for easy order selection, conservation of aisle space, complete stacking safety, safer transport and shipping. All these plus the 75% storage space savings made possible by their "fold-flat" feature.

USP Palletainers have eliminated the guesswork from warehouse parts handling —storage operation. See for yourself how well they will solve your problems—

Union Steel Palletainers are immediately available in three specific types, a variety of practical sizes and capacities ranging from 2000 to 6000 lbs. per unit—conservatively rated. There is a USP Palletainer to match every handling job.

Our field trained materials handling engineers will gladly assist in determining your present and future needs . . . without obligation. Their services are yours for the asking.

USP PALLETAINERS

manufactured by

UNION STEEL PRODUCTS CO. ALBION, MICHIGAN

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WEIGHS 28 LB

LIFTS 1,000!

KELLER AIR HOISTS

Lightness in weight is an advantage you get when you LIFT WITH AIR. One man easily carries a Keller Air Hoist up a ladder and hangs it . . . thus it is easy to move from place to place in the shop, and to service.

POSITIVE CONTROL OF THE LOAD—The Keller Air Hoist operates with an air valve, so it has an infinite number of speeds from the merest "nudge" to 17 fpm. Spotting is easy and accurate with the positive displacement motor and mechanical brake that locks the load in place.

LOWER MAINTENANCE COSTS—An air motor cannot burn out—from overload, stalling, continuous use, or too frequent reversals. Thus tne use of air hoists usually brings a substantial reduction in down time and expense.

Available in 3 capacities—300, 1,000, and 2,000 lb. For full information, ask for Catalog Section 86.

KELLER TOOL COMPANY

1321 Fulton St., Grand Haven, Mich.

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LITTLE JOB?

BIG JOB?

delicate job ?

...cela ne fait rien

There's a Colson® CASTER RIGHT for your needs

BIG JOB?

COLSON Forgeweld Casters

The world's finest caster for extra heavy duty requirements. Wheels of cast steel, iron, rubber, molded plastic—in capacities up to 6000 pounds per caster.

That's right! Whether you work in Paris or Peoria, whether you make pies or pig iron, there's an easy-rolling COLSON Caster that meets your needs—*exactly*. For the price of new, roll-easy COLSON Casters you can convert old, bumpy hard-to-push hand trucks to an efficient, smooth-sailing fleet—at very small cost.

Why not write today for free booklet on COLSON materials-handling equipment, or better still, look in the yellow pages (under "Casters") for the Colson office near you?

LITTLE JOB?

COLSON PressWeld Casters

An improved low-cost caster with hardened raceways and unbreakable fork and top plate. Ideal for dollies, racks, box trucks and similar applications in the moderate capacity range.

delicate job ?

COLSON Pneumatic Casters

COLSON Pneumatic and Semi-Pneumatic casters are ideal for handling fragile products over rough, bumpy floors. Available in rigid or swivel models with 6", 8" or 10" tires.

THE COLSON CORPORATION

ELYRIA, OHIO

CASTERS • HAND TRUCKS • LIFT JACK SYSTEMS

Hydraulic, Electric and Mechanical Power Lifts and Transports

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in Equipment

Summaries of latest information from manufacturers. For more details, use the free-mailing Reader Service Card.

Dock Board Safety Curb Cuts Damage

A new series of magnesium dock boards, which incorporates many advances in design and engineering, has been announced by Magline, Inc. Of all-magnesium construction, the Magliner boards are equipped with a unique, new safety curb, which cannot be damaged by power truck wheel rims. A special-alloy curb end of cast magnesium, engineered to provide three times the usual strength at the critical point of stress, has been incorporated into the boards. Curb ends are of wide-radius design to facilitate turning in narrow quarters. Capacities up to 20,000 are available.

Circle No. 196 on Reader Service Card for more information

No More Rehandling

Rehandling of small parts' original shipping containers can be eliminated through use of the Chas. Wm. Doepke Manufacturing Company's new NesTier Rollover Hopper. In use, a full box or keg with lid removed is slid into a bolted-down hopper through back panel opening, retaining lid is secured and the unit rotated on its pivot trunnions. Ajustable sliding gate controls flow of parts into hopper tray, permitting easy three-finger withdrawal of parts.

Circle No. 197 on Reader Service Card for more information

Butterfly Speed Control

A butterfly speed control unit which provides easier operation of operator-led electric industrial trucks is announced by Automatic Transportation Company. The new device, a double-wing finger bar, actuates the push button forward-reverse control on all Transporters, Transtackers and Transtractors. The unit was specifically designed for easier finger-tip control of operator-led equipment when stacking and maneuvering in close quarters. A change-over kit is available to convert standard 101 units to the new control.

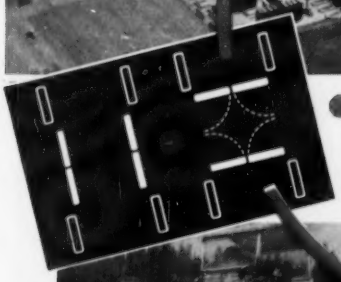
Circle No. 198 on Reader Service Card for more information

Feeding Without Interference

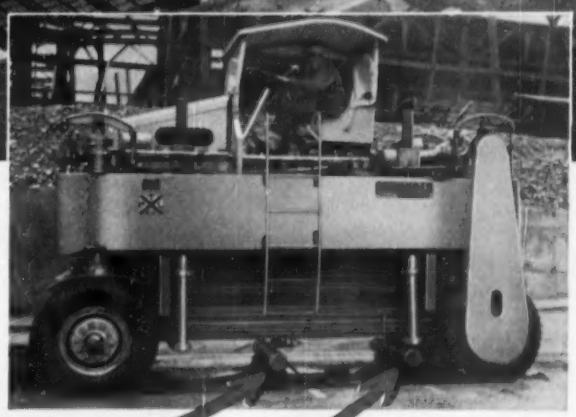
Feeding of commodities from two conveyor lines into one line, without interference, is accomplished by the "E-Z-Merger" device manufactured by Standard Conveyor Company. The unit can be used with success at various converging angles, and can be raised or lowered to suit the height of commodities weighing from two pounds upward. Arms travel in a 90 degree arc, and may be changed in the field to allow for the converging of a long and a short box into the same conveyor line.

Circle No. 199 on Reader Service Card for more information

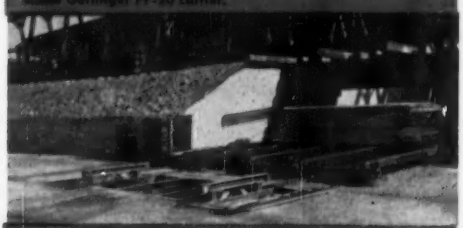
SAVES $4 PER 1000 BOARD FEET OVER PREVIOUS MANUAL HANDLING!



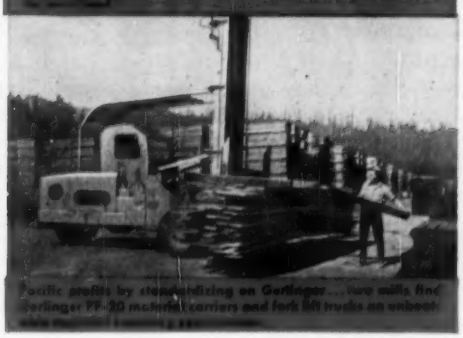
PF-20 is driven onto load with forks parallel. Over stacks, forks turn 90° to contact load, lifting on or off permanent stations. Capacity: 20,000 lbs. Lifting height: 12" up to 30".



Four arms, hydraulically operated, swing under lumber on rolls. Control on pipe standard permits centering short loads under Gerlinger PF-20 carrier.



Floor chains, which automatically move after PF-20 strips lumber from metal stacks, transfer chains for hitch. Lumber trips switch, stopping and starting chains. Unit is ready



Pacific profits by standardizing on Gerlinger... two mills find Gerlinger PF-20 material carriers and fork lift trucks an unbeat-

Gerlinger Fleet "JOB-PROVED" for COMPLETE MECHANIZED Operation at Pacific Lumber's Redwood Mills

There's only one model of material carrier in all the world that could make possible the unique operation that has made Pacific Lumber Company one of the largest and best equipped plants of its kind... *and that is Gerlinger's exclusive PF-20!*

(The Gerlinger PF-20 has the shortest turning radius in ratio to wheelbase of any carrier on the market.)

One operator on one of Pacific's pivot fork carriers can handle up to a half-million feet of redwood in 8 hours on a half-mile run, taking lumber both ways, thanks to PF-20's hydraulic-controlled fork pivoting mechanism. No bolsters or yard helpers are needed.

Pacific... like more and more big lumber producers who find it pays to standardize on Gerlinger... keeps 3 Gerlinger PF-20's and 2 Gerlinger Fork Lift Trucks "on the go" at the two mills. This unbeatable Gerlinger work team insures a faster, steadier flow of production, prevents damage that's inescapable with "MAN-handling", and requires minimum maintenance.

Call or write your Gerlinger dealer now for full details and specifications. No obligation.

GERLINGER PRODUCTS

G-411

GERLINGER CARRIER CO. • DALLAS, OREGON

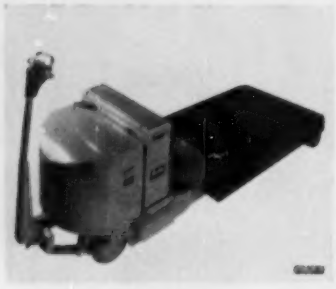
Circle No. 77 on Reader Service Card for more information

Continued

Tierable Hopper Dump Box

A hopper-front dump box designed for compact tiering and roll-over dumping has been developed by Union Metal Manufacturing Company. Construction of the corrugated 12-gauge steel containers permit small quantities of material to be manually removed from stacked boxes through the hopper front. Fork trucks can quickly shift loaded boxes between storage areas and work stations. Fork slots on both sides of the box provide for safe roll-over dumping. Four-way fork entry speeds handling in crowded quarters.

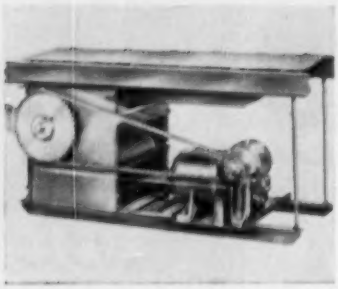
Circle No. 200 on Reader Service Card for more information



Heavy Handling Over Light Floors

A hand motorized lift truck which will handle heavy machinery over a floor of limited capacity has been developed by Lift Trucks, Inc. Two "Hydroelectric" Dyna Dual Power Packs are used for motive power. They are said to give best weight distribution between axles, as well as good stability and tremendous pulling power, with four driving wheels. The truck is equipped with auto steering links and standard handle controls, with two speeds forward and reverse.

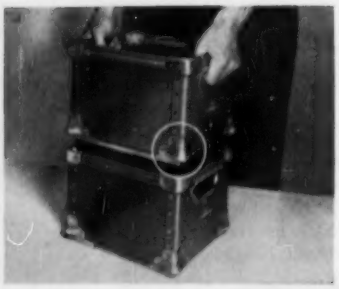
Circle No. 201 on Reader Service Card for more information



Combination Center Drive and Take-Up

Marketing of a new combination medium duty center drive and take-up has been announced by Lamson Corporation. The unit can be combined with roller gravity conveyors to form belt or live roll conveyors. Standard widths of 12 to 24 inches, in two inch increments, are available. Gear-head motors are of one-half to one horsepower, with a maximum effective pull of 300 pounds. The combination unit is designed to use regular 3 ply belting.

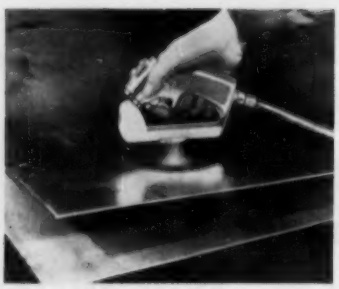
Circle No. 202 on Reader Service Card for more information



Stacking Stability Improved

A simple but effective improvement for stacking type mill and shop boxes has been announced by William Bal Corporation. By incorporating a unique bulge in pressed steel corner reinforcements for the bottoms of vulcanized fiber boxes, the manufacturer claims to have improved stacking stability whether full or empty. The new corner distributes stacked weight at points furtherest removed from the center of gravity and where greatest box strength occurs.

Circle No. 203 on Reader Service Card for more information

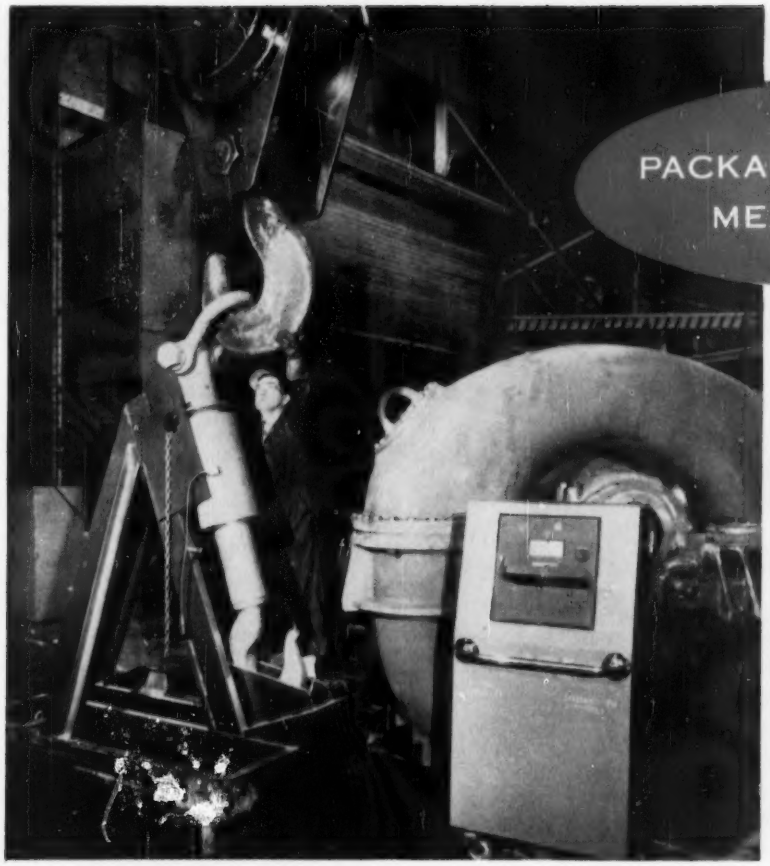


Separates Sheets by Compressed Air

The Pres-Vac Sheet Lifter, manufactured by F. J. Littell Machine Company, is designed for safety and ease in separating and moving sheets of steel. A vacuum is produced by passing compressed air through the venturi at 45 pounds per square inch, which is conveyed to the rubber cup through passages in the handle. The neoprene cup will pull 11 pounds per square inch, is highly oil resistant and will stand up under normal shop conditions. Handle is of one-piece cast aluminum.

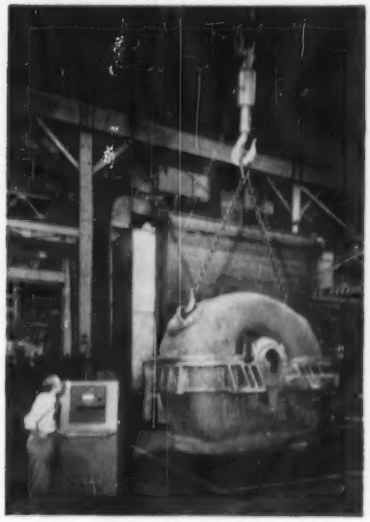
Circle No. 204 on Reader Service Card for more information

(Continued on page 180)



PACKAGED PRECISION MEASUREMENT

Weight is measured in SR-4 crane scale in swivel hook (shown resting in cradle at left) and weight is indicated remotely on mobile indicator (right foreground in picture at left). Photograph below shows actual weighing operation.



A leading manufacturer of electrical equipment cuts weighing costs by 12% with accurate, remote-indicating SR-4® Crane Scale

At a leading manufacturing company of electrical equipment, a Baldwin SR-4 Crane Scale has decreased annual weighing costs by 12%. The crane scale is used to weigh accurately huge turbines, generators and propulsion gears while they are being moved on 50 ton capacity cranes. Accurate weight measurement is important information for planning shipment of the equipment and its installation at the eventual site of operation.

This company's materials handling section found their SR-4 Crane Scale gave them these five important, cost-cutting advantages over their previous, beam-balance, method of weighing:

1. *Greater Accuracy*—The SR-4 Crane Scale has been tested for accuracy of 0.2 percent measuring loads from 850 lbs. to 34 tons.

2. *Greater Capacity*—The SR-4 unit can weigh anything up to the limits of the 50 ton cranes on which it is used.

3. *Convenience*—Remote indicating of weights simplifies weighing operations . . . saves valuable time and manpower.

4. *Interchangeability*—The SR-4 unit is interchangeable between all of the cranes in operation. Thus, one unit performs a multitude of weighing operations.

5. *Lower Maintenance*—Maintenance is limited almost exclusively to simple greasing of the swivel hook.

You, too, will profit when you use *Baldwin Packaged Precision Measurement* to simplify operations, save you time and money . . . in any measurement of load, fluid pressure or torque. You'll benefit by sending today for our illustrated bulletins which will give you complete detailed information. Address Dept. 3311, Baldwin-Lima-Hamilton Corporation, Philadelphia 42, Pa.

BALDWIN BLH LIMA-HAMILTON

BALDWIN-LIMA-HAMILTON

General Offices: Philadelphia 42, Pa. • Offices in Principal Cities
In Canada: Peacock Bros., Ltd., Montreal, Quebec

Circle No. 172 on Reader Service Card for more information

Engineered

Pallet type "Walkie" truck 4000 to 6000 lb. capacity.

TO FIT YOUR JOB . . .

Model G. A. Tractor

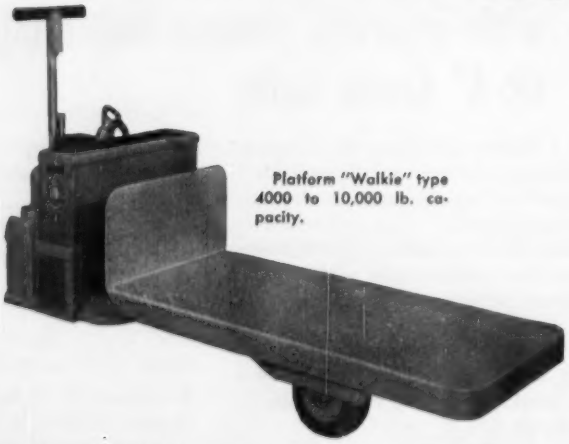
. . . AT NO EXTRA COST*

***CUSTOM BUILT OR . . .**
. . . STANDARD MODELS

Whether your materials handling job requires special applications or is adaptable to standard models, the cost is relatively the same.

Our Engineers will welcome the opportunity to discuss YOUR particular material handling job . . . Moto-Truc's can be engineered to fit the job. Investigate their "Job application" offer in the economical "Walkie" type lift trucks. Your inquiry will receive prompt attention.

SEND FOR BULLETIN #53



Platform "Walkie" type 4000 to 10,000 lb. capacity.

Hi-lift "Walkie" type 3000 to 4000 lb. capacity.

Representatives in Principal Cities

The MOTO-TRUC Co

1955 E. 59th St. ● Cleveland 3, Ohio
Pallet . . . Platform . . . Hi-Lift Trucks
LARGEST EXCLUSIVE MANUFACTURER OF "WALKIES"

MOTO-TRUC
Designers FOR THE INDUSTRY
PATENTED

Circle No. 115 on Reader Service Card for more information

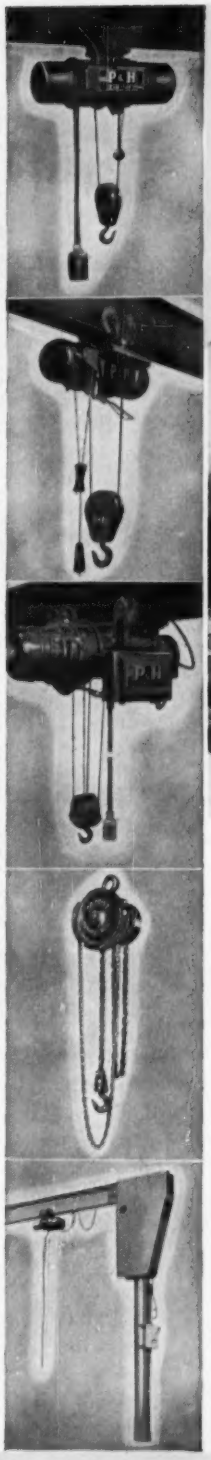
P&H Zip-Lift Electric Hoist (Pushbutton control)
Handy little power-house for loads from 250 pounds up to one ton. Versatile — in use in metal shops, dairies, hospitals, bakeries. Solves your load-handling problem within the weight limits specified. Plenty of literature available for more detailed information. Ask for it.

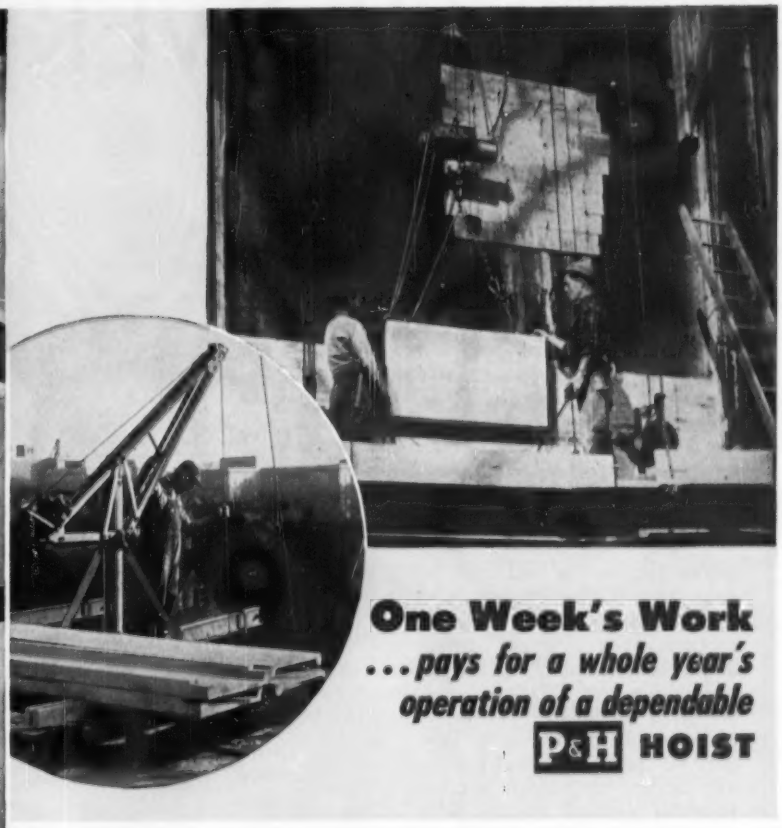
P&H Zip-Lift Electric Hoist (Rope Control)
You can do anything with the two rope controlled models that you can with the Pushbutton Zip-Lift. The less expensive rope control gives you a break on price—doesn't cut down the number of jobs you can perform. You get years of trouble-free service at an extremely reasonable initial cash outlay.

P&H Hevi-Lift
For heavy loads — and your own particular problem. The Hevi-Lift is a custom-built hoist — manufactured to your specifications. Over 3,000,000 variations possible on this husky load-handler. You're sure to find the right combination for you. Take a look at the literature available — then see your P&H distributor for a concrete solution.

P&H Hand Chain Hoists
Perhaps you're in the market for a hand chain hoist; rather than wire-rope. If you are, you'll have to look far to find a better value than these P&H work-horses. Handle up to 25 tons easy as pie. Spur-geared; Timken or roller bearing trolleys; Army-Type trolleys — whatever you need. Ask for literature on the complete line.

P&H Jib Cranes
Hang your hoist on a P&H Jib Crane — then you've got a dependable one-two combination working for you. Eight different models — bracket-type, mast-type and pillar-type. Capacities up to 12,000 pounds. Use the coupon for fast return of literature on the complete P&H Line.





One Week's Work
...pays for a whole year's operation of a dependable P&H HOIST

Construction Contractor Gets 51 Weeks of "Free" Hoisting

THE Dahlman Construction Company of Milwaukee, Wisconsin, figured it would save a little time if it bought a P&H Hoist to lift stone slabs from the ground to the work area.

It sure did.

It saved so much that by Friday noon of the first week's operation, one year's cost had been saved and the use of the P&H Hoist for the balance of the year was pure velvet!

Now the masonry foreman and one laborer are setting stone slabs that weigh as much as 1,200 pounds, at a rate of 150 square feet per day. Before the P&H Zip-Lift Hoist was put to work, it used to take three or four men *just to lift* one stone slab. And it used to take them about ten minutes to lift the slab and ease it into position.

Today, the two men lift the slab and put it in exact position in only four minutes!

It's easy to see how this time- and labor-saving P&H Hoist can pay for itself so quickly. The experience of the Dahlman Construction Company could be *your* experience. Call your nearest P&H Distributor and ask him to show you how you can convert lifting time into profitable time with a P&H Hoist.

Tear out and mail today ➧

P&H HOISTS

HARNISCHFEGER CORPORATION
4643 W. National Ave. • Milwaukee 46, Wis.

P&H Hoists
HARNISCHFEGER CORPORATION
4643 West National Ave., Milwaukee 46, Wisconsin

Gentlemen: Send me the complete, detailed story on how Dahlman Construction Company paid for a P&H Hoist in one week. I'm also interested in P&H Zip-Lift, Pushbutton Control ☐, P&H Zip-Lift, Rope Control ☐, P&H Hevi-Lift ☐, P&H Hand Chain Hoists ☐, P&H Jib Cranes ☐.

Name.....Title.....
Company.....
Address.....
City.....Zone.....State.....

8808

Circle No. 171 on Reader Service Card for more information

HORSEPOWER

. . . a size and type for every need

Whether it's repowering old equipment or buying new — too much or too little horsepower can prove costly. Equally as important as proper horsepower, is correct engineering of the application. Quite often, it is necessary that engine accessories be mounted in accordance with requirements of the equipment. It usually takes a right size and right design to supply the specific power needs for each type of machinery.

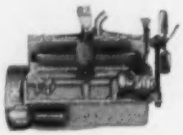
The engineering and sales policy of Hercules Motors Corporation is to design and sell internal combustion engines to fulfill the specific needs of each customer. For example, in equipment with limited engine installation area, "flat" or horizontal engines are often the answer. These engines can be placed under floors, or in any area which does not permit vertical installation. (Consult factory for models available.) Special Hercules vertical engines with accessories located on one side, permit installations near a firewall or bulkhead which is permanent and does not allow access to one side of the engine. These are but a few of the many problems which are often encountered in the proper application of an engine.

Our basic line of Hercules engines, 70 models from 3 to 500 H.P., is designed and engineered to meet the exact and varying demands of industry. We build engines for operation on gasoline, diesel fuel, natural gas, L. P. Gas, kerosene, or any other standard fuel that is readily available. That's why we have been known as "Engine Manufacturing Specialists Since 1915"

If you'd like to know more about our engines, write for the folder "Hercules Engines". It lists the sizes and power ratings of each model. If, however, you have a specific power problem give us the details. Our engineers will work with you to solve your problems and of course, there is no obligation.

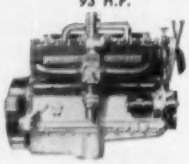
Hercules Model NXB
2 cylinder gasoline engine
15.6 H.P.

Hercules Model DOOD
4 cylinder diesel engine
79 H.P.

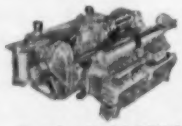


Hercules Model JXD
6 cylinder gasoline engine
112 H.P.

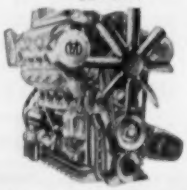
Hercules Model DIX6D
6 cylinder diesel engine
93 H.P.



Hercules Model HXE
6 cylinder gasoline engine
236 H.P.



Hercules Model DFXHF
6 cylinder diesel engine
260 H.P.



Hercules Model DNX-V8DTS
8 cylinder diesel engine
500 H.P.

Engine Specialists since 1915

HERCULES ENGINES

HERCULES MOTORS CORPORATION

113 Eleventh Street, S. E. • Canton, Ohio

Circle No. 85 on Reader Service Card for more information

John B. Kaymen and **Edward T. Bialashewski** have been appointed field engineers by **Lamson Corporation.** Kaymen will

Bialashewski

J. B. Kaymen

cover southern Massachusetts and Rhode Island, and Bialashewski will handle sales for the Los Angeles area.

Exclusive **Lewis-Shepard** sales and service representative in the Ontario, Canada area is **Upton Bradeen** and **James Limited.** The firm, has offices in Toronto, Hamilton and Windsor. **Donald B. Carpenter,** who has wide experience in the field, is head of the material handling department.

D. B. Carpenter

New field engineer for **Rack Engineering Company,** New England Division, is **John K. Nielson,** who has an extensive background in plant operational methods and material handling problems.

In line with a major expansion program, the Southern California branch of the **Ira G. Perin Company** has moved to

At the Amsco plant in Denver, this 15-ton Lorain "TL" Self-Propelled Crane, model SP-254, uses a chain sling to load flasks onto a flatcar. This Lorain also uses a magnet for handling scrap and other foundry metals.

Another Amsco plant . . . and another Lorain "TL" Self-Propelled Crane, a 17½ ton, model SP-254W. Here, Amsco use their Lorain Crane, with a ¾-yd. clamshell bucket, to load foundry sand from cars to storage bins. Used with 36" magnet for handling scrap . . . and for utility.

At their Chicago Heights plant, the scene is repeated again. Here, a 10-ton Lorain Self-Propelled Crane, model SP-152, as a clamshell, unloads cars of coke and sand; as a crane, handles flasks; also scrap with a 33" magnet.

HOW AMSCO CUT COSTS COAST TO COAST

Visit any of five Amsco plants . . . in Missouri, California, Delaware, Illinois, Colorado. You'll see a familiar sight at each plant . . . Lorain Cranes. The American Manganese Steel Division of the American Brake Shoe Company relies on Lorain Cranes to handle materials of all kinds. To date, six Lorains have been purchased for these five plants because Amsco has found this modern Lorain crane method the answer to efficient, low-cost yard material handling.

At left, three Amsco plant operations are shown. Each Lorain Crane is a Self-Propelled, model "TL". Each is a different capacity. Notice the different materials being handled. Amsco reports they handle *foundry sand, coke, scrap, steel castings* and *other semi-finished products*. They get such versatile material handling with an assortment of front ends — *hook blocks, chain slings, clamshell buckets* and *magnets*.

Such multiple ownership and multiple use by Amsco is good proof of their satisfaction with Lorain cost-cutting performance, adaptability and flexibility to a wide variety of material handling conditions. One-man operation with equal efficiency at any hour, in any season, releases manpower for production, lowers costs. Rubber-tire mobility takes Lorain Cranes anywhere fast. Long-reaching booms stack farther and higher, further reduce aisle space, thus increasing storage capacity.

Lorain material handling cranes are available in capacities from 6 to 61 tons on a wide assortment of crawler or rubber-tire mountings. The same reasons five Amsco plants find them the answer to low-cost material handling needs are the reasons you should check with your Thew-Lorain Distributor today.

THE THEW SHOVEL CO., LORAIN, OHIO

THEW LORAIN®

OFFERING MORE THAN 126 SHOVEL-CRANE COMBINATIONS ON CRAWLERS OR RUBBER-TIRES . . . . TO BEST FIT YOUR JOB FOR PROFIT!

Circle No. 147 on Reader Service Card for more information

SALES FIELD

Continued

larger quarters at 5422 E. Washington Boulevard, Los Angeles. The firm, distributors of **Elwell-Parker** equipment, also maintains offices, warehouse and service facilities at 575 Howard Street, San Francisco.

The appointment of the **Joe Coursey Equipment Company, Inc.**, 240 Broadway, Denver, Colorado, as sales and service representatives for **Yale & Towne Manufacturing Company,** has been announced by **James H. W. Conklin,** general sales manager. The firm will cover the state of Colorado and eastern Wyoming.

The Impact-O-Graph Corporation is being represented in Ontario, Canada by **Protective Packaging Company,** 94 Haddington Avenue, Toronto. The new representative in the Washington, Oregon, Montana and Idaho areas is **Tachograph Sales and Service Company,** 1928 First Avenue South, Seattle. The announcement came from Impact-O-Graph president, **Willard S. Mielziner.**

Donald F. Brickley has been appointed regional manager of **Motorola Communications & Electronics, Inc.,** and will cover the states of Idaho, Montana, eastern Nevada, Washington, Wyoming and Utah.

D. F. Brickley

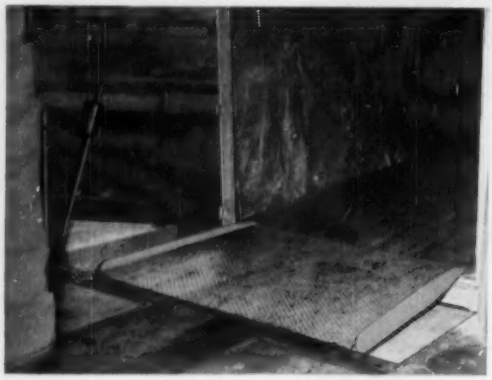
He joined the parent company, Motorola Inc., in 1937, was appointed a radio communications engineer in 1948, and became a zone manager in 1950. New regional office headquarters are located at 3833 N.E. Union Avenue, Portland, Oregon.

Euclid Sales and Service, Inc., 5231 Manchester Avenue, St. Louis, Missouri, is the sales and service distributor for **Bucyrus-Erie** Company, serving 85 counties in the states of Missouri and Illinois.

Silent Hoist & Crane Company announces the appointment of **John M. Finlayson, Jr.** as district sales manager for the Mid-Central states. From Detroit, Michigan, Finlayson is well known in the Tractor and Automotive Industry, and was formerly associated with Dearborn Motors Corporation, Mather Manufacturing Company, and J. I. Case Company.

Material Handling, Inc. conducted a material handling show at Pittsburgh's Old County Airport on Sept. 16-18. Held under a huge tent which covered 5,000 square feet, the show featured a wide assortment of equipment from baggage dollies to 15-ton cranes and was attended by some 2,000.

The perfect bridge between truck and dock...



RITE-HITE® ADJUSTABLE LOADING RAMP

can solve many of your loading dock problems

PERMANENT-TYPE RAMP becomes an integral part of loading dock. Can be installed in new or existing construction at very low cost. Horizontal adjustment feature reduces truck maneuvering.

SELF-CONTAINED RAMP AND DOCK for non-permanent installation. Ideal for leased buildings — can be moved easily to new location. Horizontal adjustment feature reduces truck maneuvering.

FLUSH-TYPE RAMP for permanent installation. Can be locked in position flush with loading dock surface when not in use. Dock traffic can travel over it freely.

3 TYPES . . . EXCLUSIVE RITE-HITE PRECISION COUNTERBALANCE . . . no pipes, pumps, gears, motors . . . little or no maintenance required.

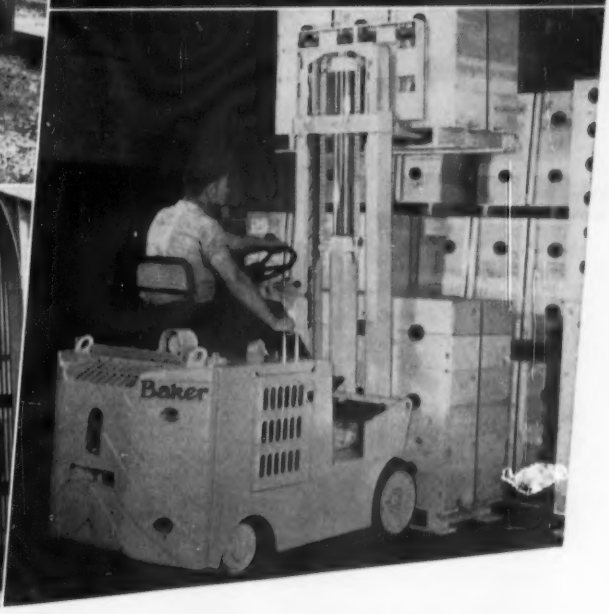
5 MODELS to choose from . . . 10,000 and 20,000-pound capacities . . .
Priced from $395.00.

RITE-HITE® DIVISION
LOOMIS MACHINE COMPANY
FOURTH AND PINE STS. • CLARE, MICH.

Plan now to install RITE-HITES . . . write Dept. F-104

Circle No. 100 on Reader Service Card for more information

and Now—
BAKER TYPE FG STRAIGHT GAS



NOW— Baker has ALL THREE types of GAS FORK TRUCKS

● To its economy-priced, pneumatic-tired YARDLOADER and its premium GAS-O-MATIC line, Baker now adds the commercial version of its STRAIGHT-GAS fork truck—manufactured in quantity for the U. S. Armed Forces during the last two years. For ordinary fork truck applications this new Baker Type FG features low initial cost, low maintenance, speed and economy. It is built to the same high engineering standards that have characterized Baker electric trucks for over 35 years. Available in most wanted capacities.

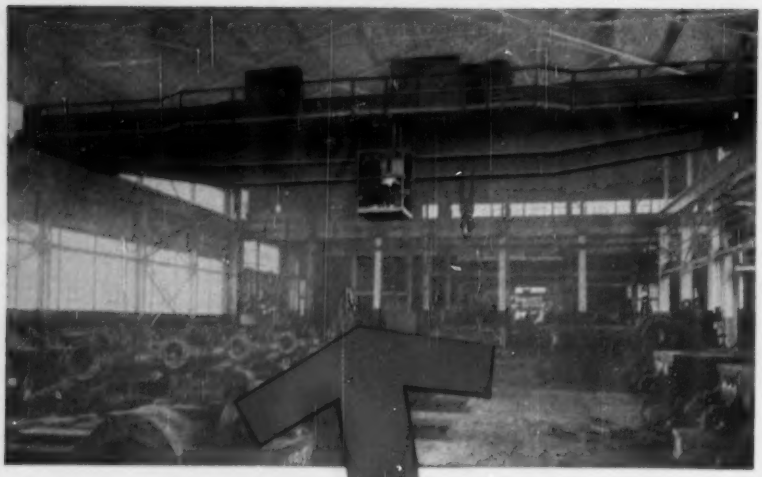
If you need a fork truck for rugged outdoor-indoor handling—on rough floor or ground conditions—or where long hauls are involved, you can save up to $1,000 initial cost by buying the speedy Baker EY-40 "YARDLOADER"—pneumatic-tired, heavy-duty, gas-powered—the lowest priced fork truck in the 2-ton class.

Outstanding gas truck in the Baker line is the GAS-O-MATIC. The gas engine drives the exclusive GAS-O-MATIC generator to supply power to the Baker electric motor—giving electric truck performance and operating economy at premium gas truck initial cost. Gas consumption for normal service of 2-ton model about ½ gallons per hour. Capacities 4,000 to 6,000 pounds.

Descriptive bulletins are available. Write the Baker-Raulang Company, 1219 West 80th Street, Cleveland 2, Ohio.

Baker.
industrial trucks

Circle No. 181 on Reader Service Card for more information



WHY WAIT MONTHS

FOR YOUR NEXT CRANE

For too many years, crane builders have made every order a "production". Weeks of extra engineering, custom built parts, and endless delivery delays have been standard fare for the buyer.

Fortunately, MICHIGAN CRANE is young enough not to have pet prejudices and experienced enough to produce excellent cranes at competitive prices and in a spectacularly short time.

For example, many plants have low clearances between the top of the crane runway and the lowest roof obstruction—which calls for a "low headroom" crane. Most manufacturers call in a troop of engineers for the job. But, because all Michigan cranes are designed for minimum headroom, chances are one of our standard models will fit—saving you weeks of waiting and considerable expense.

Give us a chance to prove it; write for Bulletin 154 to Michigan Crane & Conveyor Co., 116 N. McKinstry Avenue, Detroit 9, Michigan.

MICHIGAN

Crane & Conveyor Company

Circle No. 110 on Reader Service Card for more information

SALES FIELD

Continued

New Northwest franchise representative for **Automatic Transportation Company** is **The Hallidie Machinery Company**, with offices in Seattle, Tacoma and Spokane, Washington, and Portland, Oregon. The firm will serve Washington, Montana and Northern Idaho. **Lyall Crissman Company,** Automatic Pittsburgh representative, has moved to new quarters at 421 Mt. Lebanon Boulevard.

Republic Steel Corporation has announced three recent appointments for the sales and distribution of its materal handling equipment. They are: **J. Alex Gordon & Company,** 810 Stephenson Building, Detroit, Michigan; **Thompson & Johnson Equipment Company, Inc.,** Baker Street, Syracuse, New York; and **Hohl Industrial Sales Company, Inc.,** 2603 Main Street, Buffalo, New York.

Hyster Company recently outlined its overseas marketing program to more than 40 representatives at an export school in Peoria, Illinois. The weeklong meeting was attended by Hyster dealer representatives from 18 foreign countries, including such distant points as Johannesburg, South Africa, Auckland, New Zealand and Santiago, Chile.

Two new dealer appointments have been announced by **Clark Equipment Company, Industrial Truck Division. Eureka Boiler Works,** Eureka, California, will handle Clark sales and service in that area of California, and **George Industrial Equipment Company, Inc.,** 11th Avenue at 50th Street, New York City, is the manufacturer's exclusive distributor in the Greater New York area.

They thought they needed 3 trucks

. . . but Yale showed them the one Truck that did all 3 jobs

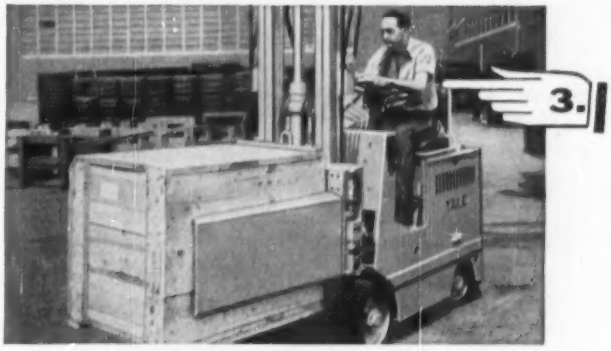
The experience of many firms shows what can be done in your own plant. For one YALE Truck . . . *with the proper Yale attachments* . . . can do virtually every lifting, moving, and stacking job . . . easily, efficiently, and economically. And, every Truck in the complete YALE line can quickly be fitted with the use-extending attachments that your operation requires.

You can now acquire the YALE equipment you need without delay and without major investment under YALE's flexible "3-Way-Finance-Plan." Ask your local YALE representative for details. Or mail the coupon today.

YALE *MAGNETIC* CAM-O-TACTOR—**a time-delay speed controller with exclusive features no other controller can match—provides smooth acceleration, long contact life, trouble-free operation.**

1. **A host** of handling jobs like the one illustrated require no special attachments . . . can be economically performed by the YALE Electric Truck alone.

2. **The revolving** clamping device on this YALE Electric Truck handles huge paper rolls with tender care. Rolls can be stacked either flat or up-ended.



3. **Handling large,** bulky units is no problem for the Electric Truck and clamping device. Like all YALE attachments—it's installed or removed in minutes.

YALE*

INDUSTRIAL LIFT TRUCKS AND HOISTS

*Reg. U. S. Pat. Off.

MAIL THIS COUPON TODAY

The YALE & TOWNE Manufacturing Co., Dept. 410
11000 Roosevelt Blvd., Phila. 15, Pa.
Please send me further information on.

- ☐ YALE Trucks and Attachments:
- ☐ YALE "3-Way-Finance-Plan"
- ☐ YALE Magnetic Cam-O-Tactor

Company_____

Name_____ Title_____

Street_____ City_____ State_____

In Canada write: The Yale & Towne Manufacturing Company
St. Catharines, Ontario, Canada

Gas, Electric, Diesel & LP-Gas Industrial Trucks • *Worksavers* • Hand Trucks • Hand & Electric Hoists • Pul-Lifts

Circle No. 164 on Reader Service Card for more information

IT WORKS WONDERS IN MATERIALS HANDLING-

300 to 400% increase in efficiency

75% decrease in handling costs

One Truck-Mounted
Dempster-Dumpster Handles Scores
of Containers... All Designs... All Sizes

With the Dempster-Dumpster System, one truck-mounted Dempster-Dumpster accomplishes more than several conventional dump trucks. You eliminate trucks standing idle. You eliminate re-handling of materials. You eliminate loading crews. You increase efficiency, sanitation and good plantkeeping with this Dempster-Dumpster System—the lowest cost method of bulk materials handling ever devised.

It's like having one truck with scores of bodies. One truck-mounted Dempster-Dumpster serves scores of detachable containers. These containers range from 2 to 21 cu. yds. capacity for use with recommended type Dempster-Dumpsters. Each container is designed to suit the materials to be handled—be they solids, liquids, dust, bulky, light or heavy. You simply place these containers at convenient materials accumulation points outside or inside buildings. As each is loaded, it is picked up, hauled and dumped (or load set down intact). Entire operation is handled by hydraulic controls in cab by only one man, the driver.

The list of manufacturers using the Dempster-Dumpster equipment reads like the "Who's Who Among the Nation's Leading Manufacturers". We mention this simply to point out that dozens of the nation's oldest and most successful firms use the Dempster-Dumpster System because of its efficiency and tremendous savings. Write to us now for complete information. Manufactured exclusively by Dempster Brothers, Inc.

Representatives in principal cities throughout the United States, Canada and foreign countries. There's one near by to serve you promptly.

DEMPSTER BROTHERS, 6104 Shea Bldg., Knoxville 17, Tennessee

ARO

Variable Speed AIR HOIST

Choice of Controls . . . New Pendant, push-button, instant stop or start, up or down . . . also, double cable control.

Variable Speed . . . 1000 lbs., 0 to 38′ per minute . . . quieter . . . no spark hazard . . . explosion-proof motor.

AIR-powered for Safety . . . can't burn out . . . can't overheat . . . permits continuous use . . . unaffected by dust or fumes.

Lightweight . . . only 28½ lbs.—overall length, 10½″.

SEE YOUR ARO DISTRIBUTOR

THE ARO EQUIPMENT CORPORATION
Bryan and Cleveland, Ohio

Aro Equipment of California, Los Angeles, Calif.
Aro Equipment of Canada, Ltd., Toronto 1, Ontario
Offices in All Principal Cities

ARO® AIR HOIST
Also . . . Air Tools . . . Lubricating Equipment . . . Aircraft Products . . . Grease Fittings

Circle No. 16 on Reader Service Card for more information

SIMPLICITY AND INGENUITY have made

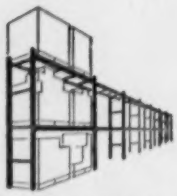
American STORAGE RACKS

First Choice

YEAR AFTER YEAR

AN EXCLUSIVE AMERICAN FEATURE

Adjustable Pallet Racks



Standard Pallet Racks

Skid Racks

Drum & Barrel Racks

Tool & Die Racks

Coil Racks & Tiering Racks

American Tubular Storage Racks are designed to meet practically every storage need. They are used in every type of business, large and small. Get the facts on American Racks before you decide on any type rack. Send for catalogue.

Send for Catalogue!

American Pallet Racks used in shipping and receiving area, S. S. Kresge Co. warehouse, Fort Wayne, Indiana

AMERICAN METAL PRODUCTS CO.

STORAGE RACK DIVISION

5959 Linsdale • Detroit 4, Michigan

Circle No. 10 on Reader Service Card for more information

Calendar of Events

October 2-10
National Retail Lumber Dealers Expo.,
Kingsbridge Armory,
New York, N. Y.

October 4-8
18th Southern Textile Exposition,
Textile Hall,
Greenville, S. C.

October 5
MHI Traveling Clinic,
Sheraton-Plaza Hotel,
Boston, Mass.

October 6
MHI Traveling Clinic,
Syracuse Hotel,
Syracuse, N. Y.

October 16-19
Conveyor Equipment Mfgrs. Asso. Meeting,
Greenbrier Hotel,
White Sulphur Springs, W. Va.

October 18-22
42nd National Safety Congress & Exposition,
Chicago, Illinois

October 19-21
Caster & Floor Truck Mfgrs. Asso. Meeting,
Hollenden Hotel
Cleveland, Ohio

October 26-28
12th Annual Manufacturers' Products Exhibit,
Emerson Hotel,
Baltimore, Md.

November 1-5
National Metal Show,
International Amphitheater,
Chicago, Illinois

November 9-11
3rd Canadian National Packaging Exposition,
CNE Automotive Building,
Toronto, Canada

November 10-12
18th Annual Time & Motion Study & Management Clinic,
Sherman Hotel,
Chicago, Illinois

November 13-17
10th Annual Meeting,
The Magnesium Association,
Chase Hotel,
St. Louis, Missouri

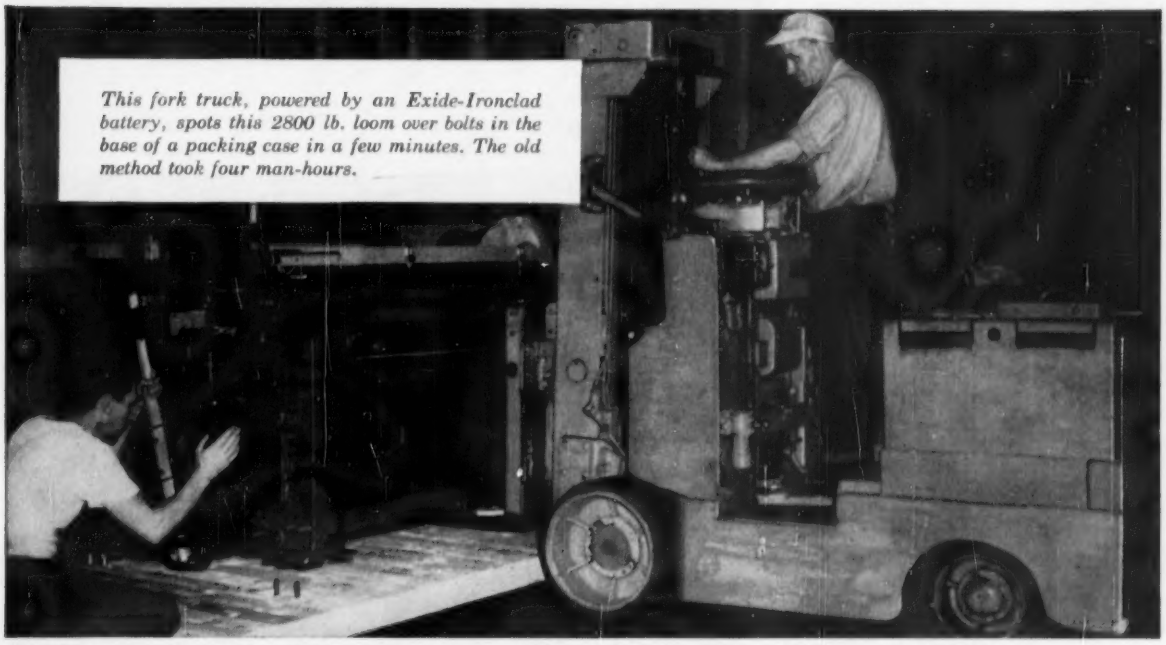
November 15-18
International Soft Drink Industry Exposition,
Convention Hall
Philadelphia, Pa.

November 21-22
Automatic Control Equipment Exposition,
Waldorf Astoria Hotel,
New York, N. Y.

November 29-December 2
International Automation Exposition,
244th Regiment Armory,
New York, N. Y.

GET FAST, SAFE HANDLING

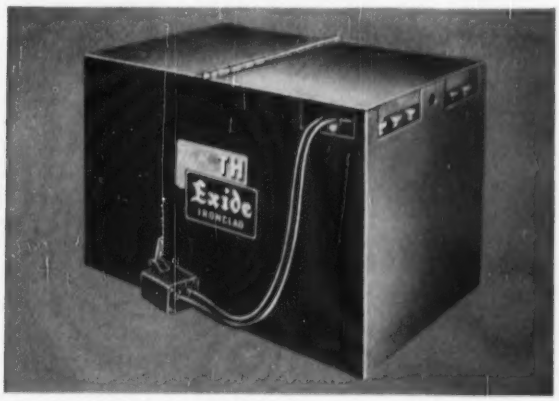
...with low cost Exide®-Ironclad® power!



This fork truck, powered by an Exide-Ironclad battery, spots this 2800 lb. loom over bolts in the base of a packing case in a few minutes. The old method took four man-hours.

YOU GET fast, safe and low cost handling when your lift trucks are powered by dependable Exide-Ironclad batteries. In addition, these rugged, long life batteries assure full-shift operations and high availability of equipment. Lower costs for operation, maintenance and depreciation make Exide-Ironclads your best power buy—AT ANY PRICE!

THE POSITIVE PLATES are the heart of any battery. Only Exide uses a slotted tube construction. By use of tubes, more active material is exposed to the electrolyte, providing *greater power*. Also, more active material is retained, giving *longer working life*.



THE NEW THRIFTY HAULERS! The improved industrial truck battery using *non-oxidizing* plastic power tubes for longest battery life, more capacity in the same space. For full details, call your Exide sales engineer—write for Form 1982 (Installation and Maintenance of Motive Power).

Your best power buy ...AT ANY PRICE!

Exide®
IRONCLAD BATTERIES

Exide INDUSTRIAL DIVISION, The Electric Storage Battery Company, Philadelphia 2, Pa.

Circle No. 64 on Reader Service Card for more information

LITERATURE

FEATURED IN THIS MONTH'S ADVERTISEMENTS

Spotting or Switching: If you have railroad cars to spot, move and switch, The Frank G. Hough Company says it will pay you to get full details on its revolutionary "switcher" and what it can do.
Circle 89 on Reader Service Card

Electric Towing Tractor: Clark Equipment Company claims its new electric towing tractor is the first true tractor-type electric machine on the market. The driver sits at the rear of the tractor, within an arm's reach of the coupler.
Circle 45 on Reader Service Card

First Choice: Said to be first choice year after year, American Metal Products Company's tubular storage racks are designed to meet practically every storage need, according to the manufacturer.
Circle 10 on Reader Service Card

Seasoned Workhorse: The Trackmobile of Whiting Corporation pulls freight cars, switches them and spots them. Said to be a seasoned workhorse in every industry, even though only three years old.
Circle 160 on Reader Service Card

What's Your Problem? The yard handling problems of industry are many and varied, but no matter what your material handling problem may be, Bay City Shovels, Inc. says it will pay you to ask them for complete details.
Circle 28 on Reader Service Card

Most Specified: The heavy duty engines of Wisconsin Motor Corporation are claimed to be the most specified for original equipment power.
Circle 162 on Reader Service Card

Process Belts: Ashworth Bros., Inc. says that no matter what your product or process is, they have a belt design and wire size to help carry it more efficiently and more economically.
Circle 18 on Reader Service Card

Portable Belt Conveyors: Manufacturers, warehousemen and retailers are said to find the Model R Versaveyor bag and box handler an easy way to speed up material handling and slow down costs. Manufacturer is The Belt Corporation.
Circle 29 on Reader Service Card

Helpful Library: Nutting Truck & Caster Company offers its library of material handling helps which covers 63 years of manufacturing "know-how."
Circle 122 on Reader Service Card

Up—Over—Around: No matter what your bulk handling problem is, whether vertical or horizontal, Baughman Manufacturing Company says its equipment will perform the job faster and cheaper.
Circle 27 on Reader Service Card

Greater Utility: Gripper woven wire slings give you greater utility says The Cambridge Wire Cloth Company. The slings are available in capacities up to 100,000 pounds.
Circle 40 on Reader Service Card

Built to Absorb Punishment: Otis heavy duty elevators are designed for power truck loading and are said built to absorb off-balance, extra static or impact loading.
Circle 127 on Reader Service Card

Elevating Tray Conveyors: Hard-to-manage multi-story handling jobs are simplified, costly hand operations are reduced, and rough handling damage and waste are eliminated, when you install a Robo-Lift on your production line, says the manufacturer, Counsel Machine Company Inc.
Circle 53 on Reader Service Card

Complete Service: Whether yours is a steel strapping or a strapping tape problem, a trained salesman from the Brainard Steel Division of Sharon Steel Corporation, will recommend and demonstrate whichever method is best for you.
Circle 35 on Reader Service Card

Overload Cut Out: How to save the cost of down-time by the use of an Anchor-Waldron automatic overload cut out is well explained by John Waldron Corp. The unit is said to protect machinery, reduce maintenance and increase production.
Circle 167 on Reader Service Card

Reliable: Fairbanks-Morse says whether you want to weigh a package or a pachyderm, you can rely on its scales. In other words, there's no problem too small or too large for it to handle.
Circle 68 on Reader Service Card

Maximum Efficiency: Correct control will utilize maximum crane efficiency, according to The Euclid Crane & Hoist Company, which offers the counsel of its engineers, without obligation.
Circle 67 on Reader Service Card

Model TM
PAYLOADER Tractor

Picture this "switcher" in your yard

This unusual "switch engine on rubber" is racking up some unusual performance records in terms of greater speed, more convenience and overall economy on car-moving operations at industrial plants, yards and docks.

Not bound by rails, it travels quickly from one "move" to another by the shortest route—across the tracks if need be — and no switches have to be thrown.

Full equipment includes 4-wheel-drive, 4-wheel vacuum-booster brakes, power-steering, air brake equipment, dual railroad couplers front and rear, switchman platforms and catwalks. Power is gasoline or diesel engine, as desired, and drive has full-reversing 4 speed transmission plus torque converter.

If you have railroad cars to spot, move and switch, it will pay you to get full details on this revolutionary "switcher" and what it can do. The Frank G. Hough Co., 945 Sunnyside Ave., Libertyville, Illinois.

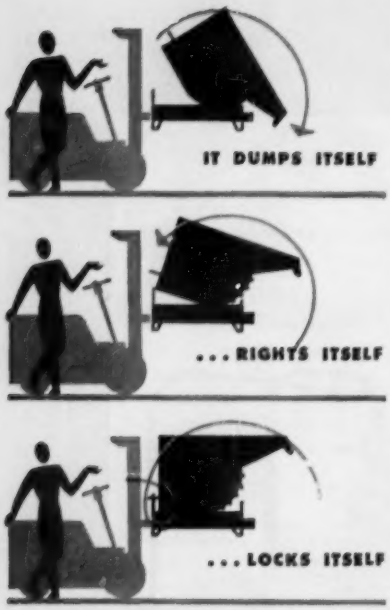
Gets any place in the yard by the shortest, quickest route without regard to rails and switches.

•

16,000 lbs. drawbar pull — more pull per pound than rail-mounted engines.

PAYLOADER®
THE FRANK G. HOUGH CO. LIBERTYVILLE, ILL.
SUBSIDIARY—INTERNATIONAL HARVESTER COMPANY

Circle No. 89 on Reader Service Card for more information



and lives a long and useful life

Not only do Roura Self-Dumping Hoppers cut handling and unloading costs of wet or dry, hot or cold bulky materials 50% or more . . . they do it year after year with little maintenance or repair. That's because Roura Self-Dumping Hoppers are engineered to take "hard knocks" . . . extra heavy gauge metal . . . sturdy arc-welded joints . . . perfect balance for smooth and rhythmic operation.

The rugged Roura gives you simple one-man semi-automatic operation. Models to fit any standard fork or platform lift truck. Also available mounted on live skids, or with malleable or rubber tired wheels or casters. Sizes range from ½ to 2 cubic yards.

ROURA
Self-Dumping
HOPPER

WANT MORE DETAILS on how you can save money with Roura? Just clip this coupon . . . attach it to your letterhead . . . sign your name . . . and mail to

ROURA IRON WORKS, INC.
1411 Woodland Ave., Detroit 11, Michigan

Circle No. 136 on Reader Service Card

AD LITERATURE

Continued

Investment in Efficiency: Standard Conveyor Company says that the purchase of its equipment is an investment in efficiency that will pay you for years.

Circle 142 on Reader Service Card

Special Engineering. A case history report is given by Elwell-Parker on one of its trucks in a Canadian plant. Special engineering by Elwell-Parker enabled the firm to cut its truck investment 40 percent.

Circle 66 on Reader Service Card

Pound for Pound: Wirewound Box Manufacturers Association says that pound for pound wirewound containers give your product the best possible protection.

Circle 161 on Reader Service Card

Dock Shelters: How loading dock shelters can save money for you is explained in a free guide offered by Atlas Industries, Inc.

Circle 19 on Reader Service Card

Huge Savings: Forty-two cents per unit were saved by a manufacturer when it switched to the use of Tape-Strap for packaging. This is the story told by Mid-States Gummed Paper Company in this month's ad.

Circle 111 on Reader Service Card

For Every Need: A size and type horsepower for every need is offered by Hercules Motors Corporation, engine specialists since 1915.

Circle 85 on Reader Service Card

Practical Solution: New Kimpak 301 is offered by Kimberly-Clark Corporation as the practical solution to surface damage to furniture finishes during shipment.

Circle 96 on Reader Service Card

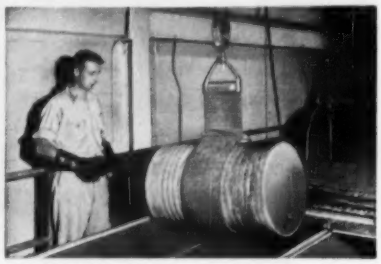
GRIPPER

WOVEN WIRE

SLINGS

give you

GREATER UTILITY



Specially designed handles permit use in choke or basket hitch. Broad, flat sling body gives greater load stability. Complete flexibility gives greater gripping power, even around small radius loads.

Woven wire construction eliminates kinking, tangling, snarling. When not in use, they'll roll up into a compact coil or hang flat against a wall.

All metal construction means long life, freedom from damage, even in handling sharp edged loads.

Available in standard lengths and widths with capacities up to 100,000 lbs. Special sizes on request. Every sling pretested to meet loading specifications.

See your mill supply, materials handling or safety equipment distributor. Or, write direct for complete catalog and name of nearest distributor.

The Cambridge Wire Cloth Co.
Dept. W • Cambridge 10, Md.

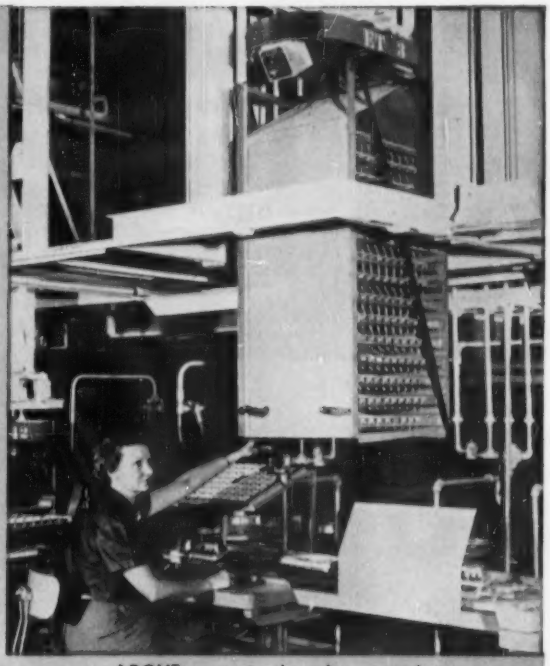
WIRE CLOTH | METAL CONVEYOR BELTS | SPECIAL METAL FABRICATIONS

OFFICES IN PRINCIPAL INDUSTRIAL AREAS

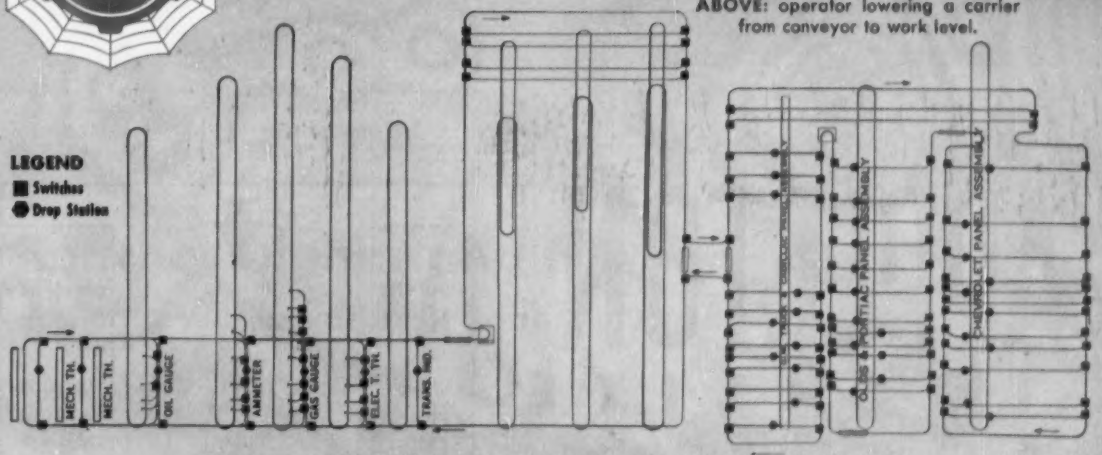
DISTRIBUTORS—write for open territory data!

Circle No. 40 on Reader Service Card

400
Electric Brains
Control Carriers on
POWER & FREE CONVEYORS



ABOVE: operator lowering a carrier from conveyor to work level.



GENERAL ARRANGEMENT OF CONVEYORS AND ASSEMBLY LINES.

Four Hundred electric brains (selector switches) automatically guide loaded and empty parts carriers to predetermined assembly points over the 1320 feet of Webb Power & Free Conveyors at this Spark Plug plant. As carriers move along main Power & Free conveyors they are automatically switched into proper "siding" according to setting of selector switch. Conveniently located drop stations on each "siding" permit lowering of individual carriers to bench level.

Being fully automatic in operation, this Webb conveyor system maintains an unfailing flow of parts and sub-assemblies to workers. In addition, conveyors serve as storage banks that provide quick visual inventory and assure consumption of current production—rapid rotation of stock greatly reduces accumulation of dust on precision parts and results in inventory savings.

JERVIS B. WEBB CO.

Conveyor Engineers and Manufacturers

8935 ALPINE AVENUE • DETROIT 4, MICHIGAN

Send for fully illustrated catalog that provides complete information on Webb conveyors

FACTORIES: DETROIT • LOS ANGELES • HAMILTON, ONTARIO

OFFICES AND REPRESENTATIVES THROUGHOUT THE WORLD

Circle No. 156 on Reader Service Card for more information

THE ONLY FIXTURE SPECIFICALLY DESIGNED FOR

CORRECT SHELF *and* BIN ILLUMINATION

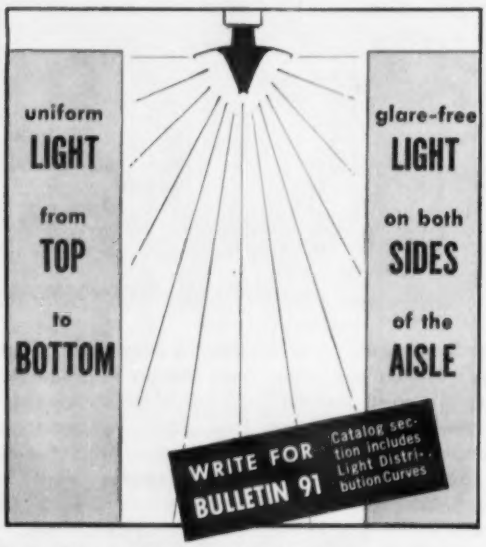
THE NOVEL SHAPE DOES THE TRICK

Stocklites promote good vision, efficient work and employee morale. This stockroom is flooded with controlled, glare-free light to its farthest recesses. Orders are handled faster, more accurately. Costs go down . . . profits up.

FILL ORDERS FASTER, MORE ACCURATELY WITH THE

APPLETON
STOCKLITE

End spotty, harsh, eye-tiring lighting once and for all! Install *Appleton Stocklites* . . . special fixtures that wipe away murky gloom, and let you read labels, small parts numbers, order slips . . . *all the way* from top bin to floor level. The novel shape does the trick . . . prevents wasted light, assures even diffusion, reduces eye fatigue and speeds up order filling with fewer errors. *Stocklites* are attractive, distinctive, permanent fixtures finished entirely in white, triple-coated, vitreous-fired porcelain enamel . . . easily installed, quickly cleaned and extremely corrosion resistant. Inquire now. See how *Appleton Stocklites* give more light, better light from your present lamp wattages.



Sold Exclusively Through Selected Wholesalers

REFLECTORS EASILY REMOVED and CLEANED

4 Mounting Styles

Seprable design — no tools needed. Four mountings: pendant, right angle, feed-thru and outlet-box with Seprable keyless or pull-chain sockets . . . ¼ turn release and spring-cushioned for firm contact, longer life. Take 5 standard lamps—50 to 200 Watts.

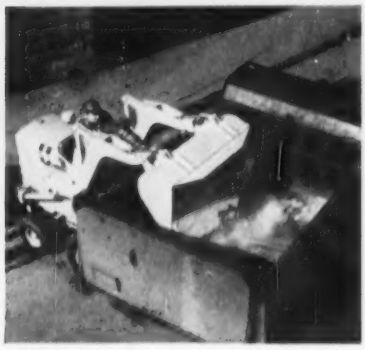
APPLETON ELECTRIC COMPANY
1729 Wellington Avenue • Chicago 13, Illinois

Also Manufacturers of:

Rely on **APPLETON** *. . . The Standard for Better Lighting*

Circle No. 168 on Reader Service Card for more information

Higher dumping clearance of 4'6" under lip (6'8" under hinge) puts higher equipment, bins and hoppers within convenient reach.



Flared 55" wide bucket lip and full 45° bucket angle when in dumping position (both greater than other loaders) aid discharge.

Reaches higher and farther

to bring you lower bulk handling costs

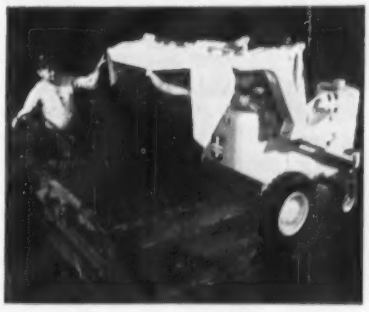
Dumps over edges to 6' 8" high, reaches up to 4" farther; 45° dumping angle aids discharge

The extra reach and clearance of the Jaeger Auto-Scoop make it possible to dump into higher bins, hoppers, trucks . . . to place loads accurately, where you want them. 4'6" clearance under bucket lip, 6'8" under hinge and longer reach of 2'7" are all greater than comparable 12 cu. ft. scoop loaders.

The Auto-Scoop easily handles 1200 lbs. (up to 20% more than other loaders of its size) at all dumping heights and positions. Boom arms and bucket are under finger-tip hydraulic control. Double-acting pistons dump and retract the bucket, discharge fast or slow as needed, enable operator to reach over edge of bins, dump and retract before returning, and can rack or shag bucket clean of sticky materials. Flared 55" wide bucket lip and 45° dumping angle insure cleaner, faster discharge.

Specifically designed for most efficient scoop loader operation, the Auto-Scoop also offers shortest turning radius (6'6"), greater power (33 hp @ 1800 rpm), up to 25% faster speeds, lowest bucket tilt-back, lower carry and other features that contribute to overall gains in production. Write for Catalog L12-4 and name of distributor who sells and services the Auto-Scoop in your city.

(Comparisons based on other well-known scoop loaders now in the field).



Extra inches provided in both forward and vertical positioning help operator spot loads accurately, with minimum effort.

Drums, bags, small parts and many other materials are also economically handled. Here the Auto-Scoop also stacks its load.

For bigger work, Jaeger offers the 1 cu. yd. Load-Plus, with torque converter, power steering and either front-wheel or 4-wheel drive.

The Jaeger Machine Company, 611 Dublin Avenue, Columbus 16, Ohio

JAEGER LOAD-PLUS auto-scoop

AIR COMPRESSORS • PUMPS • MIXERS • PAVING MACHINES

Distributors throughout U.S. and Canada and Principal Cities of the World

Circle No. 169 on Reader Service Card for more information

ACCO products

Wright Hoists

Don't judge a hoist by its weight • IT'S THE DUTY CYCLE THAT COUNTS!

• By redesigning the 1954 WRIGHT FRAME 1 SPEEDWAY HOISTS, we offer a light weight hoist but not a light duty hoist. They are built, and guaranteed, to be satisfactory for *any* duty cycle for which 30-minute NEMA motors are satisfactory. When you install a Frame 1, you have a hoist for heavy duty service but designed and built to modern specifications throughout to remove excess weight. You can't buy a hoist that will stand up under harder service.

But that's only part of it. Maintenance costs, which consist of replacement parts, labor for adjustments and repairs, and idle labor during repairs, make the Frame 1 Speedway the most economical hoist to buy and use.

There is nothing to adjust but the brake cam and that is done only twice during the three million cycle brake lining life by merely moving one screw to another position. The brake springs and solenoid are factory-set and *never* need adjustment for brake lining wear. Remove only two screws and the brake and controller are completely accessible. Take out three more screws and you can easily get at limit switch, transformer, and solenoid coil.

Check the duty cycle rating of the hoists you plan to buy. Then figure that your total cost equals the price you pay PLUS maintenance costs. Buy right . . . buy WRIGHT Frame 1 Speedway Hoists.

See your WRIGHT Hoist distributor or write our York, Pa., office for catalog DH133B

ACCO

Wright Hoist Division

AMERICAN CHAIN & CABLE

York, Pa., Chicago, Denver, Detroit, Los Angeles, New York, Philadelphia, Pittsburgh, San Francisco, Bridgeport, Conn.

Hoists Trolleys Cranes

Circle No. 7 on Reader Service Card for more information

AD LITERATURE

Continued

When Profit Hangs in the Balance: The E. W. Buschman Company says you should specify its conveyors if you want to produce more and handle more at lower cost.

Circle 38 on Reader Service Card

Behind Every Truck: One of the world's strongest service organizations stands behind every Hyster lift truck, according to this manufacturer. If you're not acquainted with Hyster's service policies, ask for details.

Circle 91 on Reader Service Card

Bucket Control: Clark Equipment Company says that Michigan bucket control means "bigger loads . . . faster". Send for the tractor shovel fact folio offered and find out how you can accomplish these results.

Circle 46 on Reader Service Card

Good Visibility: The front end loader operator can see his work with the bucket down or up, or when traveling from one place to another, says the Le Roi Company, which recommends the use of its new model TL-50.

Circle 158 on Reader Service Card

Storage Bins: Two big Neff & Fry coal bins at Dow Chemical are described in detail. The bins are used for handling scores of flowable bulk materials.

Circle 118 on Reader Service Card

One Truck for Three Jobs. One company thought they needed three trucks, but Yale & Towne showed them the one truck that did all three jobs. Find out how.

Circle 164 on Reader Service Card

Custom Built: A variety of slings and grabs are featured by Palmer-Shile Company, manufacturers of material handling equipment custom built to meet your needs.

Circle 87 on Reader Service Card

AD LITERATURE

Continued

New, Different, Better: For over two years the entire production of Coffing's new Super Power Ratchet Lever Hoist has gone into military service. Now it is available to bring new standards of ratchet hoist performance to civilian users.
Circle 48 on Reader Service Card

Damage-Proof: Pictured is an Edison storage battery which was undamaged after an almost five foot fall from a shipping dock. The rugged construction of the cells is one of the vital advantages pointed out by the Thomas A. Edison Company.
Circle 63 on Reader Service Card

Fast Loading: The longest trucks and the highest trucks can be loaded faster with a Barber-Greene Loader, according to the manufacturer. Details given on request.
Circle 25 on Reader Service Card

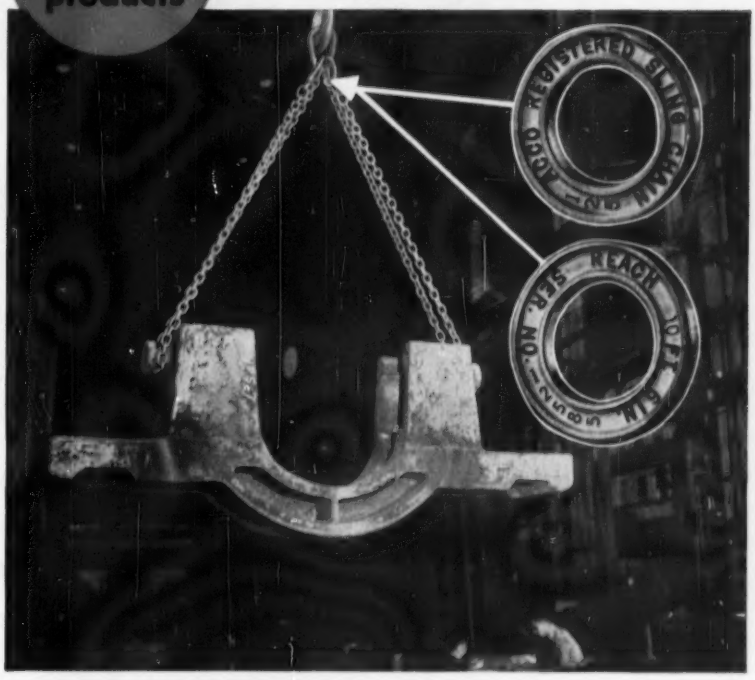
Over $50,000 Saved: The use of Cargotainers for moving and storing materials is saving Westinghouse $57,697 annually. This is the story told this month by Pittsburgh Steel Products Company.
Circle 177 on Reader Service Card

Special Talent: Babying your products is said to be the special talent of Gaylord boxes. The manufacturer tells how these boxes cradle your product in safety from the packing line to the end of the trip.
Circle 74 on Reader Service Card

Portable Gantry Crane: A new gantry crane which dismantles into a compact unit for easy storage on transporting from place to place is featured by Wise Engineering Company.
Circle 163 on Reader Service Card

ACCO products

ACCO Registered* Sling Chains



What would it cost you if you dropped this casting?

• How many times a day do you gamble with a heavy load being lifted over expensive machines—or men? If you have ever dropped a load, you know the consequences. Time lost, damages—a general mess.

That's why you must be sure of the slings you use. That's why we suggest ACCO *Registered* Sling Chains with their inherent safety. For instance, a ⅜" double ACCO *Registered* Sling Chain used as a double-basket at a 60° angle has a working load limit of 11,400 pounds, almost six tons! Furthermore—it was proof-tested—overall—with a load equivalent to *twelve tons.*

With all this strength, ACCO *Registered* Sling Chains are light in weight . . . easy for your men to handle. That's because they're made of alloy chain which provides strength, great strength, with less weight.

There's much more to tell about these fine ACCO *Registered* Sling Chains. Call your ACCO *Registered* distributor today or write us for literature.

*Trade Mark Registered

WHAT "ACCO REGISTERED" MEANS . . .

1. The best material
2. Unit safety factor (on bodies, rings, links, hooks)
3. Proof test of complete sling to twice the working load limit
4. Actual field service test of each design
5. Metal identification ring on each sling
6. Signed Registry Certificate with each sling

ACCO

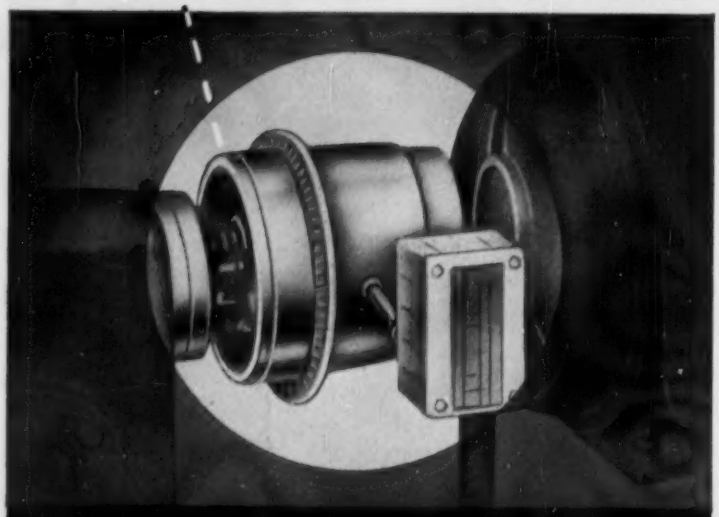
American Chain Division
AMERICAN CHAIN & CABLE

York, Pa., Chicago, Denver, Detroit, Houston, Los Angeles, New York, Philadelphia, Pittsburgh, Portland, Ore., San Francisco, Bridgeport, Conn.

plus Rings Links Hooks

Circle No. 8 on Reader Service Card for more information

SAVE THE COST OF Down-Time



ANCHOR-WALDRON

Automatic

Overload Cut Out

Protects Machinery

Reduces Maintenance

Increases Production

Here is the advanced type torque sensitive coupling which eliminates the time losses caused by sheared drive pins.

Its power "shut off" action is completely automatic and takes place at the instant of a dangerous overload. It then resets itself automatically.

The perfect answer where power is transmitted through two shafts in line and where torque limitation is necessary.

For complete details—sizes, working range, etc., write for Catalog 51FM.

JOHN WALDRON CORP.

NEW BRUNSWICK NEW JERSEY

Sales Representatives in Principal Cities

Circle No. 167 on Reader Service Card for more information

AD LITERATURE

Continued

High Quality, Low Cost: Rack Hydraulic Equipment Corporation says that the high quality and low cost of its hydraulic pallet truck is made possible by the mass production techniques it employs.

Circle 131 on Reader Service Card

No Matter What The Job: Whether you work in Paris or Peoria, whether you make pies or pig iron, The Colson Corporation offers an easy-rolling caster to meet your needs exactly.

Circle 51 on Reader Service Card

Superior Quality: Globe Woven Belting Co., Inc. says that one thing you will find in every one of its products is superior quality.

Circle 79 on Reader Service Card

Weight No Judge: You should not judge a hoist by its weight, but by its duty cycle, according to American Chain & Cable, Wright Hoist Division.

Circle 7 on Reader Service Card

World Famous: Said to be world famous for ruggedness and simplicity, long life and low maintenance, is the Type M electric hoist of Detroit Hoist & Machine Company.

Circle 59 on Reader Service Card

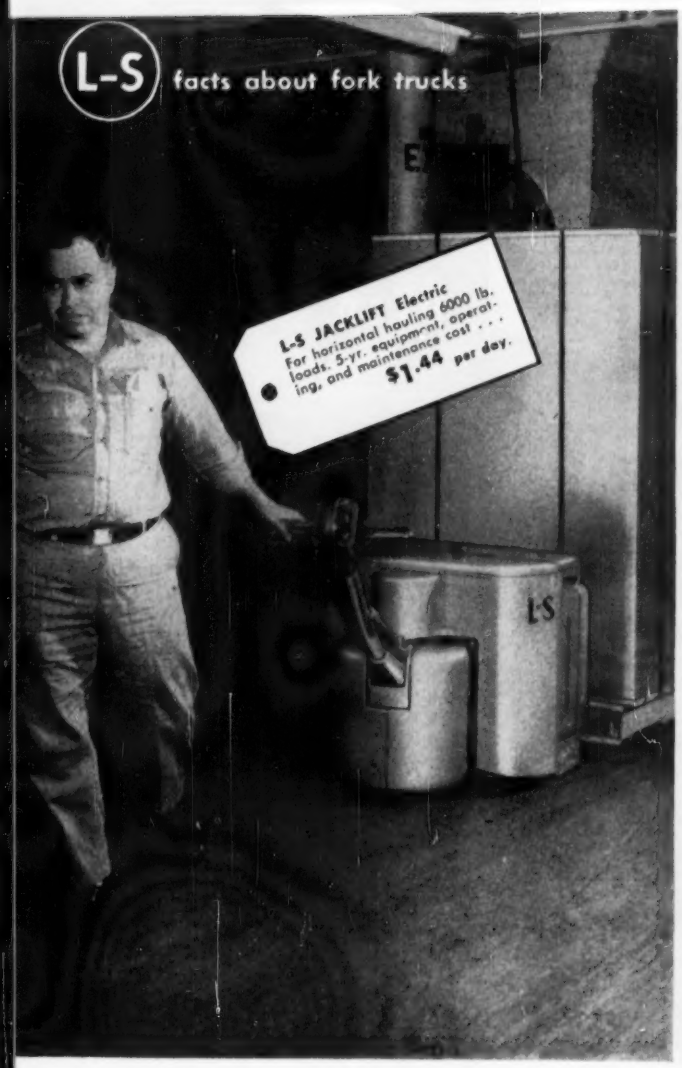
One Basic Material: Mult-A-Frame is claimed to be the only basic material you need to save on costs in 17 places in your plant. The manufacturer is the Mult-A-Frame Division of Ainsworth Manufacturing Corporation.

Circle 2 on Reader Service Card

Galvanizing Speeded: A team-work handling system that results in cost savings as well as increased tonnage through the galvanizing process is described by American MonoRail Company.

Circle 11 on Reader Service Card

MODEL 225 CONVEYOR COMBINATION


L-S facts about fork trucks
L-S JACKLIFT Electric
For horizontal hauling 6000 lb. loads, 5-yr. equipment, operating, and maintenance cost . . .
$1.44 per day.
L-S

Only $3.95 a day to own and run both these L-S Electrics!

Just think . . . you can't hire a man for $3.95 a day; yet, you can own and operate *both* these 6000 lb. L-S Electrics. You multiply manpower at a fraction of the usual cost. Here are a few L-S quality features you get in *both* these trucks:

Exclusive handle-head controls . . . all controls in one spot . . . safer, faster operation.

Exclusive electric brake operates with handle in any position including vertical . . . saves aisle space.

Exclusive L-S Hydraulic Lift System for faster lifting, lower power consumption.

Plus . . . "Lubricated-for-Life" design . . . factory-sealed bearings never need greasing . . . standard 12-volt battery gives power for full 8-hour shift, plenty of reserve power for ramps and grades . . . JackStackers lift to heights of 180".

Get all the facts! Write for NEW Catalog 34 which describes both these economical L-S Electrics.

INTERESTED IN LEASING? Lewis-Shepard offers complete Leasing, Financing, and Renting facilities. The JackLift illustrated can be leased for as little as $1.55 per day, or the JackStacker for only $2.88 per day. Mail the coupon for full information.

Circle No. 98 on Reader Service Card for more information

MULTIPLY MANPOWER · LEWIS-SHEPARD

LEWIS-SHEPARD®

34-10 Walnut St., Watertown 72, Mass.

The "MASTER"® Line

Please send

- ☐ NEW L-S JackStacker and JackLift Electric Catalog 34
- ☐ Facts about L-S Leasing, Renting, and Financing facilities

Name _____ Title _____

Company _____

Address _____

City _____ State _____

see your local

AD LITERATURE

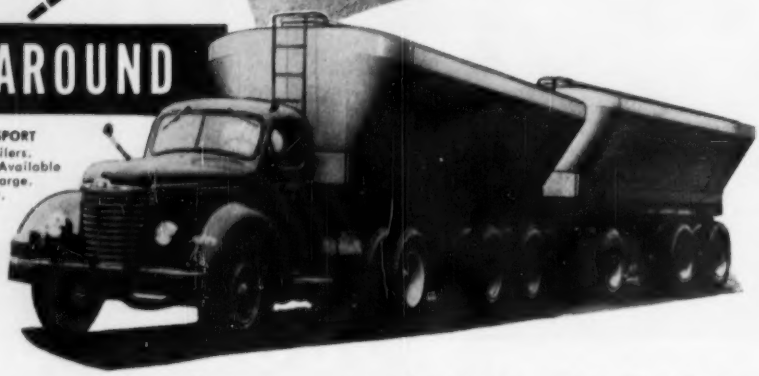
UP

MODEL 220 CONTINUOUS BELT AND BUCKET ELEVATOR
Sectional "Job-Fitted" assemblies available for every need. Open or enclosed leg. Any length from 20' to over 100'. Has specialty designed oil-cooled gear case for longer life. Write for Bulletin A-389.

MODEL 225 CONVEYOR COMBINATION
Assembled from standardized sections, easily adapted to any bulk material handling assignment. Simple to assemble, move, lengthen or shorten. Prompt delivery from stock. Write for Bulletin A-342.

OVER

AROUND



MODEL TST-10 BULK TRANSPORT
Custom-built for trucks or trailers. For dry powdered material. Available with twin-auger or belt discharge. All controls outside of body. Lengths from 9 to 35 feet. Bulletin A-376.

You'll move BULK MATERIALS

Faster, Cheaper

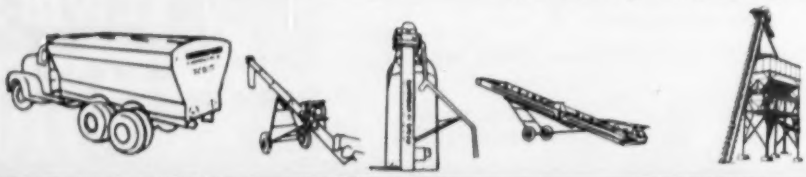
with

BAUGHMAN

Hi-Speed job-fitted

CONVEYING EQUIPMENT

for every "move" you make



BAUGHMAN MANUFACTURING COMPANY

106 Arch Street • Jerseyville, Ill.

Circle No. 27 on Reader Service Card for more information

see your local BAUGHMAN distributor today

ARIZONA. Yuma, Bessler Thomas Impl. Co. **Marana,** Marana Equip. Co. Phoenix, Western Mach'y. Co.

ARKANSAS. Rogers, Concrete, Inc.

CALIFORNIA. Oakland, Benner-Newman, Inc. Berkeley, Berkeley Ind. Supply Co. La Habra, I. J. Cool Co. South Gate, Coot Reduction Equip. Co. Tulare, Jim Ingle Co. Oakland, Mill Eng. & Mach. Co., Monarch Truck Equip. Co. Hanford, Watt Vigoria.

COLORADO. Denver, Timpte Bros., Inc., Western Mach. Co.

CONNECTICUT. Hartford, Holmes-Talcott Co.

DELAWARE. Bridgeville, O. A. Newton & Son. Milford, S. V. Wharton.

FLORIDA. Tampa. Gross Equip. Co. Jacksonville, Machy. & Supply Corp. Rivers Body Factory Lakeland, E. M. Wakeman & Assoc.

GEORGIA. Atlanta, R. S. Armstrong & Bro., Brooker Truck Equip. Co.

ILLINOIS. Chicago, Anzek Mch. Tool Sales. **Mason City,** Baughman Serv. Co. Hoopeston, Cox Bros. Rock Island, Plant Equip. Co. Moline, Moline Body Co.

INDIANA. Indianapolis, Allied Truck Equip. Co., Central Motor. Handl. Corp., Green Equip. Co., Indianapolis Belting & Sup. Co. Evansville, Hollenberger, Inc. Fort Wayne, Korte Bros.

IOWA. Boone, Baughman Mfg. Co. Des Moines, Stephens-Jones, Inc. Quimby, Simonson Mfg. Co.

KANSAS. Wichita, Travis Brown Equip. Co.

KENTUCKY. Louisville, Virgil Hack Equip. Co.

LOUISIANA. Monroe, Southern Equip. & Tractor Co.

MICHIGAN. Detroit, Acme Equip. Co., Depco Detroit Corp., Paul Horst Co., Kenneth W. Nix Grand Rapids, Assoc. Handl. Equip. Co., E. K. S. Equip. Co. Owosso, Depco Detroit, Inc. St. Joseph, Terminal Mot. Corp. Lansing, Truck & Trailer Sales.

MINNESOTA. Minneapolis, Roffridge-Johnson Equip. Co. St. Paul, O. E. Steele Sales Co. Duluth, Hood Mach. & Sup. Co.

MISSISSIPPI. Jackson, Cook & Co.

MISSOURI. St. Louis, Machinery, Inc., Materials Handling, Inc., Sloopar Equip. Co. Chillicothe, Cooke Sales & Serv. Co. North Kansas City, K. C. Diesel Power Co. Sedalia, M. J. Rossel & Sons. Hannibal, Riegel Tire & Impl. Co.

MAINE. South Portland, H. A. Burbine, Inc.

MONTANA. Helena, Caird Eng. Co. Billings, Industr. Equip. Co. Great Falls, Harmont Equip. Co. Kalispell, Treasure State Equip. Co.

NEW MEXICO. Albuquerque, Harry Cornelius Co. Roswell, Smith Mch. Co.

NEW YORK. Groton, Highway Materials Co. Binghamton, MacDougall Equip. Co. Buffalo, T. E. Potts Equip. Co., Carroll A. Ross. Pulham Manor, Tyler-Processor, Inc. Rensselaer, Van's Equip. Sales.

NORTH CAROLINA. Charlotte, C. H. Broward. Statesville, Interstate Equip. Co.

NORTH DAKOTA. Fargo, Northwestern Equip. Co.

OHIO. Cleveland, Industrial & Contractors Equip. Corp., Thos. A. Keane Co., Arthur A. Merans, Ohio Truck Equip. Co., Ohio Pipe & Supply Co. Columbus, Harry J. Reynolds & Assoc. Canfield, Myers Equip. Corp. Toledo, Riedy-Monnier Truck Equip. Corp.

OKLAHOMA. Enid, Bert Smith Road Mch. Co. Oklahoma City, Wylie Stewart Mch. Co. Tulsa, Tulsa Mch. Co.

OREGON. Amity, Burlingham Hooker Lime Co.

PENNSYLVANIA. Mechanicsburg, Amer. Equip. Corp. Philadelphia, Porter Equip. Co. Pittsburgh, Lewis & Coulter, Geo. L. Wilson & Co.

RHODE ISLAND. Providence, R. H. O. Equip. Co.

SOUTH CAROLINA. Columbia, S. Caro. Equip. Co. Spartanburg, Jos. R. Rogers.

SOUTH DAKOTA. Sioux Falls, Roy F. Drake Body & Equip. Co.

TENNESSEE. Nashville, Buchanan-Templeton Equip. Co., Dozier Equip. Co., Indust. Tractor & Equip. Co. Memphis, Scruggs Equip. Co.

TEXAS. Dallas, J. W. Barthalow Mch. Co., P. A. Ross Mch. Co. Lubbock, Conley-Lott-Nichols Co. El Paso, Equip. Supply Co., Hobbs Trailer Sales Co. Houston, F. S. Bay Co., So. Texas Truck Equip. Co. San Antonio, Roy Blossman Co. Fort Worth, Hobbs Mfg. Co.

UTAH. Salt Lake, Lund Mch. Co.

VERMONT. Montpelier, Vermont Road Equip. Co.

VIRGINIA. Winchester, Shade Equip. Co. Richmond, Smith-Moore Body Co.

WASHINGTON. Seattle, Air-Mac Inc. of Washington. Spokane, Amer Mch. Co.

WISCONSIN. Milwaukee, A-C Supply Co., Hunter Tractor & Mch. Co., Milwaukee Power Equip. Co. Madison, Johnson Welding Co. Eau Claire, Olson Equip. Co. Green Bay, Olson Trailer & Body Bldrs. Co.

CANADA. Ontario, Willowdale, General Conveyor Co. Toronto, Work-Saver Conveyor Co., Canmac Equip. Co. Quebec, Montreal, Laurentide Equip. Co. British Columbia, Vancouver, Farrow Ritchie Ltd.

HAWAII. Honolulu, Eaves & Meridith Co.

BAUGHMAN

AD LITERATURE

Continued

Engineered To Fit: The Moto-Truc Company offers custom built or standard electric walkie trucks to fit your job at no extra cost.
Circle 115 on Reader Service Card

On The Spot Weighing: With the Dillon weight indicator, loads are checked on the spot as they are moved—the instant they are lifted, according to W. C. Dillon & Co., Inc.
Circle 61 on Reader Service Card

Lot Labelling: You can get 1000 or more clear, sharp impressions from one stencil without re-inking when you use the Multistamp Stencil Duplicator, says the manufacturer, The Multistamp Company.
Circle 116 on Reader Service Card

Closing Paper Bags: Union Special Machine Company claims you can't beat its bag closing machines for lower production costs, stronger, neater closures and getting rush orders out in a hurry.
Circle 150 on Reader Service Card

First Again: New economy and efficiency in assembly or production operations are assured by NesTier Hopper Racks, says The Chas. Wm. Doepke Mfg. Co., Inc. The new units are designed to provide a constant supply of small parts and eliminate rehandling of parts at assembly points.
Circle 62 on Reader Service Card

One Machine—Many Uses: The Scoopmobile Model C, manufactured by Mixermobile Distributors, Inc. is a new machine which scoops, loads, hoists and transports. The unit features power steering, planetary drive and three-wheel maneuverability, plus numerous attachments.
Circle 117 on Reader Service Card

MOVING PERSONNEL

HAULING LIGHT MATERIAL

TRANSPORTING SUPPLIES

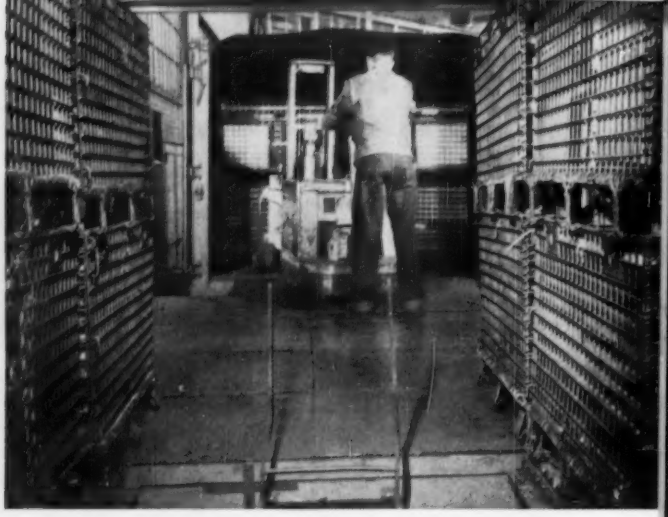
Autoette has designed especially for American industry two electric pickup trucks that provide a new approach to light materials handling problems . . . the ¼-ton pickup, ideal for moving personnel — maintenance men, watchmen, mail girls . . . the ½-ton truck for tools, supplies, equipment. Both are the last word in efficiency, safety and economy. Send for free information on how Autoette serves *your industrial needs.*

AUTOETTE
World's Lowest-Cost Transportation

AUTOETTE, INC. Dept. 11-104
730 West Esther, Long Beach 13, Calif.
Please send me information on how Autoette pickup trucks can serve my particular industry.
Name.....
Title.....
Company.....
Address.....
City..... *State*.....

Circle No. 21 on Reader Service Card

1. Packed for Shipment—Plastic circuit breaker bases and covers are laid on cardboard trays stacked 11 trays to a Cargotainer at the Westinghouse Electric Corporation's Feeder and Service Division at East Pittsburgh. Cost of $150 per day has been eliminated, as compared to handling method previously used.



2. Loaded for Shipment—Hoisted onto conveyors and rolled down to the shipping platform, Cargotainers are mechanically loaded 2-high in trailers for 40-mile trip by contract hauler to the Corporation's Standard Control Division plant at Beaver, Pa. Use of Cargotainers has reduced breakage from 17% to practically zero.

Westinghouse saves $57,697 per

Westinghouse solved industry's problem of down-time due to blown fuses and damage resulting from improper fusing by introducing the AB "De-ion" Circuit Breaker in 1928. Since its introduction, this product has been gradually replacing the switch-and-fuse because of several distinct advantages. It is tamper-proof, repetitive and reliable. When an electrical circuit is overloaded, the breaker automatically shuts off the power. Power can be restored merely by flipping the handle.

5. Storage Space is Halved because Cargotainers are stacked 5-high with ease and safety. Six-hundred unit load Cargotainers are stored to ceiling height of 12½ feet in an area of 5,254 square feet. Cargotainers, when ceilings permit, can actually be stacked 6-high.

Because of the demand for Westinghouse circuit breakers and other devices to start, stop, control and protect electrical equipment, the manufacturing operations have grown in recent years from a small department in the Corporation's East Pittsburgh plant to a new plant at Beaver, Pa. with 490,000 square feet of floor space known as the Standard Control Division.

This expansion developed some costly handling of materials. For example, the plastic bases and covers for circuit breakers are molded in one department at the East Pittsburgh plant, moved to another for conditioning, then packed for the 40-mile haul by trailer truck to the Beaver plant for assembling and shipping to customers.

In 1947 a sales engineer from Pittsburgh Steel Products Company made a proposal to management of the Beaver plant showing the advantages of Cargotainers for handling this job.

Cargotainers—the stackable, collapsible, durable, heavy-duty wire mesh (40″ x 48″ x 24″—2,000 lb. capacity) boxes for moving and storing materials have helped Westinghouse solve its materials-handling problems.

● **Cost Comparison**—Here is a summary of cost comparison between the old and new methods of handling and shipping bases and covers of Westinghouse Circuit Breakers showing an annual savings of $57,697.80.

These original Cargotainers are still going strong. Today some 8,536 Cargotainers are at work in 16 Westinghouse plants scattered across the country saving money in handling, shipping and storing materials.

Cargotainers are adaptable to all kinds of products from pipe couplings to baby food and can be handled by all types of mechanized equipment such as fork trucks, platform trucks, straddle trucks, or overhead cranes.

They are made in standard sizes or custom-built to any special

3. Unloaded at Beaver—Material is trucked to storage room or directly to one of the assembly lines. Cargotainers have reduced handling operations 95% compared to method previously used. Turn-around time for the trucker has been greatly reduced.

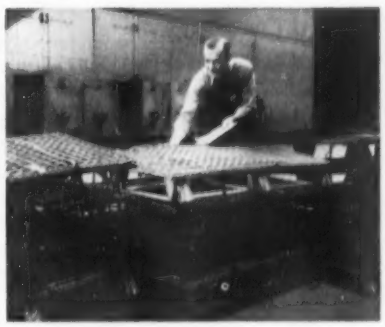
4. On the Production Line—Cargotainers enable operators easy access to plastic bases—help speed production. In handling these plastic parts with Cargotainers, here's how . . .

year with Cargotainers®

shape you may require. For complete information regarding Cargotainers and pallets, write for your free copy of "Wire Cargotainers and Pallets" or ask to have a Materials Handling Engineer call and discuss your problem without obligation.

	Old Method		New Method (CARGOTAINERS)	
	Daily	Annually	Daily	Annually
1. Truck Transportation, East Pittsburgh to Beaver	$ 3.53	$ 847.20	$10.13	$2,431.20
2. Cost of Containers	150.10	36,024.00	11.56	2,775.00
3. Disposal of Empty Containers	8.00	1,920.00	None	None
4. Cost of 1012E Separator Pad	None	None	5.70	1,368.00
5. Storage of Empty Containers	None	None	8.00	1,920.00
6. Truck Transportation, Beaver to East Pittsburgh (Empty Containers)	None	None	10.13	2,431.20
7. Material Breakage	100.00	24,000.00	Neg.	Neg.
8. Handling Cost	43.23	10,375.20	18.93	4,543.20
TOTALS	$304.86	$73,166.40	$64.45	$15,468.60

Total Annual Saving: $73,166.40 − 15,468.60 = $57,697.80



6. Returned for Next Trip—Five folded Cargotainers, taking up the same space as one unfolded, are now ready to go back on the finishing line at East Pittsburgh for another load of plastic circuit breaker bases. Many of these Cargotainers have been in continuous service without maintenance for 10 years.

"Everything New But The Name"

Pittsburgh Steel Products Company

***a subsidiary of* Pittsburgh Steel Company**

Grant Building • Pittsburgh 30, Pa.

DISTRICT SALES OFFICES: Atlanta • Chicago • Cleveland • Columbus • Dallas • Dayton • Detroit • Houston • Los Angeles New York • Philadelphia • Pittsburgh • San Francisco • Tulsa • Warren, Ohio.

PLANTS: Monessen, Pa. • Allenport, Pa. • Akron • Los Angeles • Unionville, Conn. • Warren, Ohio • Worcester, Mass.

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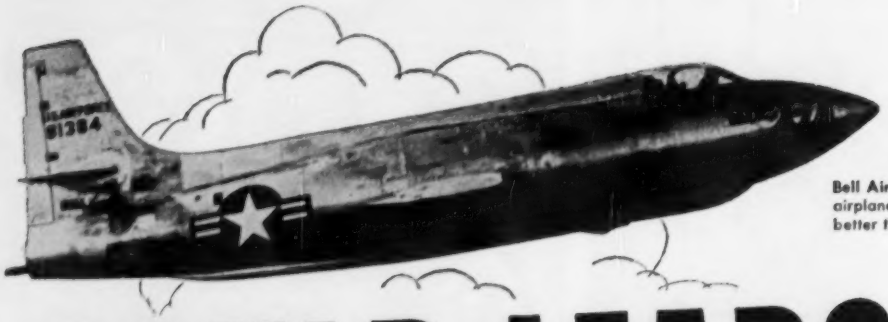

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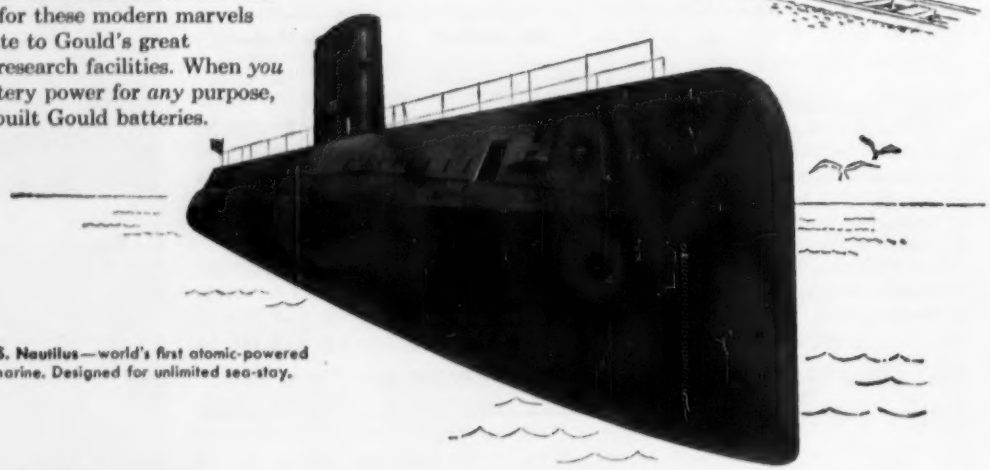

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Material Handling in a "Best Managed" Firm*--

The Grand Union Company

Leonard J. Gerweck

By Leonard J. Gerweck
The Grand Union Company

BEFORE we discuss the Material Handling approach at Grand Union, it is necessary to develop a general picture of the recent history and growth of the food chain industry.

We, in this industry, have two separate material handling situations. One of these exists at the central warehousing level and the other in the stores. The stores should also be considered as warehouses, with over 4,500 different items being carried in basement or back room areas.

In the food chain industry in general, the central warehouses have, in the past, received the bulk of the material handling analyses and attention. This was a logical focal point for several reasons.

The greatest volume, and hence the greatest return per equipment dollar, is in these locations. Also, the ceaseless drive to maintain the minimum store inventories consistent with good customer service necessitates an efficient and closely scheduled warehousing operation. This, in turn, can only be accomplished through up-to-date handling and accounting methods.

Another factor contributing to this emphasis is the abundance of material handling precedent in warehousing in general. In this particular phase, a modern operation is rapidly becoming the rule rather than the exception, and experimentation from the equipment standpoint is seldom necessary.

Store Costs Four Times Warehouse Costs

As a result of this accent, many people within our industry still confine their conception of material handling to the central warehousing phase. However,

GRAVITY-FEED type shelving, loaded behind partition, provides efficient stocking, uninterrupted service. System saves from 3 to 5 handling operations.

* Company is among those so named by The American Inst. of Management. This is another in a series of articles on material handling in such firms.

an analysis of store and central warehouse handling costs indicates that the former is more than four times the latter per ton! This ratio is based on direct labor costs, alone, and does not include store checkout costs.

From this it would appear that our greatest opportunity for additional handling cost reduction in the future is in the stores. However, the comparative neglect of this phase of our business in the past was not without some justification. The small stores of the pre-supermarket era numbered their weekly receipts in hundreds of cases. In such instances, a few hand trucks and possibly one or two pieces of gravity conveyor or a chute constituted the material handling equipment. The storage area, or "backroom"—invariably small and cramped—was usually considered as a necessary evil. Stock selection from such storage involved considerable piling and unpiling of merchandise before a given case could be selected. However, store volumes at that time were such that it was difficult to justify additional space and equipment expenditures with clear-cut savings. Improvements in appearance and worker morale were about all that could be safely claimed.

The extension of such operating methods to a present-day supermarket with receipts numbering thousands of cases per week—and storage areas in the neighborhood of 6,000-8,000 square feet—would be prohibitively expensive. Yet the fact remains that a few operators are continuing to repeat their past mistakes and are still erecting stores with area equipment deficiencies. This type of construction is usually a result of an attempt to attain as high a percentage of sales area as possible.

This is an understandable aim but adherence to such a policy ignores the fact that material handling represents almost all of our direct labor costs. Inadequate backrooms and equipment shortages make it difficult to service the sales area except at labor costs which may well offset the yield from the increased sales area.

The tremendous expansion program in which the food chain industry finds itself has undoubtedly had an effect on the handling equipment expenditures of some organizations through the consideration that limited working capital is best invested in new stores with "unnecessary" facilities held at a minimum. This viewpoint can only stem from a lack of data as to what material handling can accomplish in the way of cost reductions.

Chain and Trailer System

Grand Union's central warehousing procedure is fairly typical of the larger installations of this type in existence today. We have found the overhead drag chain and trailer system to be best suited to our operations for a variety of reasons. One is that it permits zoning of the selection area so that a given store order can be sectioned and the components selected in four different zones simultaneously. This procedure permits us to hold truck waiting time to a minimum. It reduces dock congestion and accumulation area requirements. Zoning could be accomplished with a tractor-trailer system, but the trucking hauls from the center and far end of the selection area to the dock would be excessive.

While the investment required for the conveyor system is somewhat more than that required for a tractor-trailer set-up, the maintenance and labor savings have offset this disadvantage for us.

Machine Inventory Control

Inventory control, billing and store orders are processed on punch cards in our company. This system has proven invaluable in holding the inventory-to-sales ratio to minimum as well as reducing ordering system costs.

For our inside lift truck equipment we are using the straddle-type lifts as broadly as possible. They have proven particularly valuable to us in areas such as cooler rooms, where space is always at a premium.

Market Construction Reverse of Plant Contruction

Grand Union's store level material handling program is as much a problem of space allocation and layout as it is of equipment.

LOADING operation behind store partition. Opened cases arrive from storage via belt and wheel conveyor, either from basement or same-floor stock.

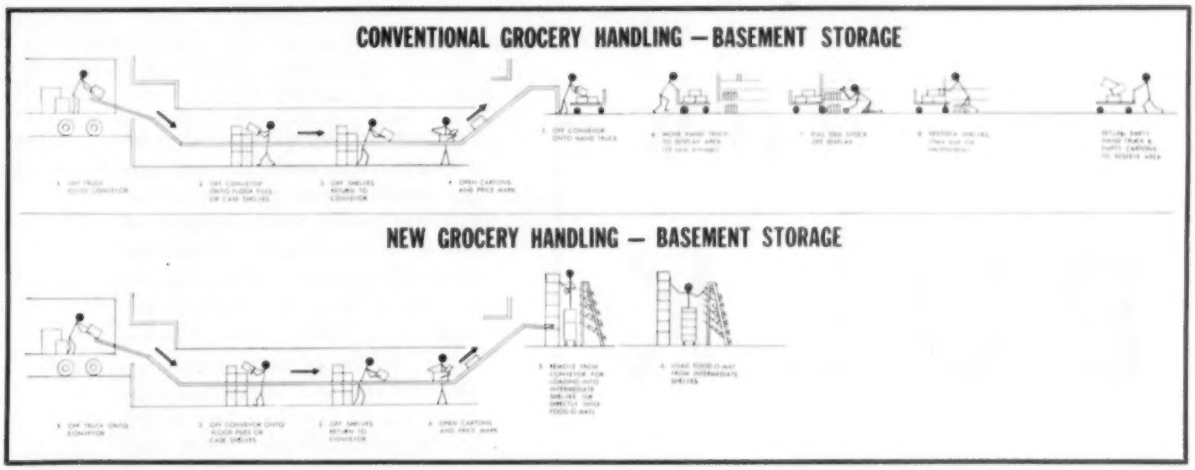

FIGURE 1: Part (A), top, is typical operation. Part (B), bottom, shows elimination of three steps.

In general, the ideal supermarket layout is the peripheral store. This, basically, is a one floor operation with the grocery, meat and produce storage and work areas forming a "U" around the back and sides of the market. Under such conditions receiving doors can be provided for each department, and transport distances from receiving to storage and from storage to the sales area are at a minimum.

However, supermarket construction is, in many ways, the reverse of industrial plant construction. The latter is, in the ideal case, merely a cover-over, a planned sequence of manufacturing operations. While this is the approach we would like to follow, we, unlike the manufacturing plant, are limited to areas where the population density will support our operations. Under such circumstances we are most often in the position of tailoring our stores to fit available locations—with factors such as land grade, traffic pattern, truck access, landlords' considerations, local codes, etc., all affecting the final store outline. Once this outline has been determined, the process of fitting the various departments, work areas, storage areas and the sales area begin.

Percentage Areas Based on Experience

The proper allocation of space within the stores has been the subject of a great deal of study within the industry in recent years, but with very little in the way of a consistent result. The only conclusion to which we have come is that we have to conduct our own research based on our own operations. The importance of this allocation cannot be overly emphasized. For example, all case goods are individually piled upon receiving and individually and manually selected from the piles when required. This means that an item must be stored in its correct location the first time it is handled, and must be selected without removing an excessive number of cases from the pile.

As an example of the expense involved, we have found that it costs three times as much to select the sixth case from the top of a stack as it does the second. In these instances, it should be remembered that we are dealing almost exclusively with less than pallet

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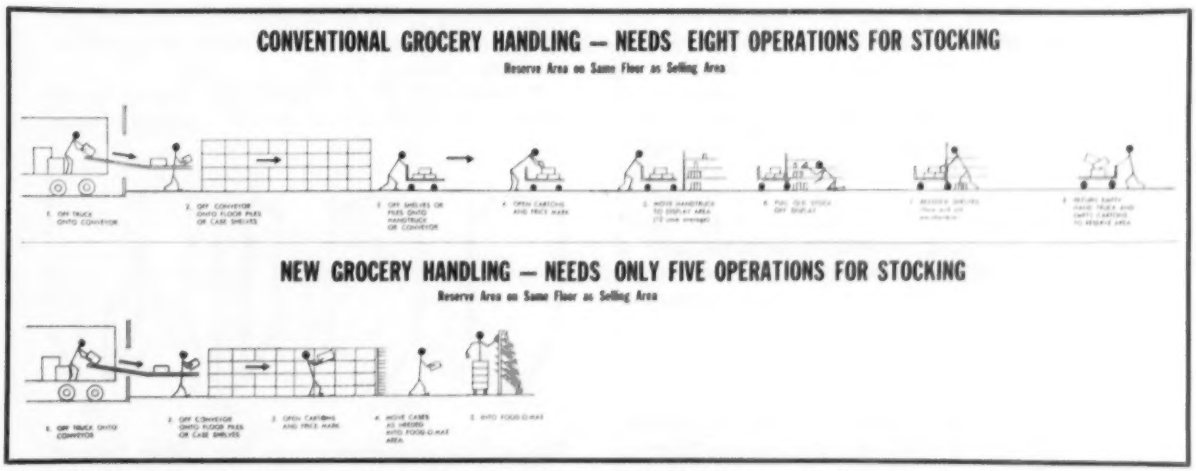
CONVENTIONAL GROCERY HANDLING — NEEDS EIGHT OPERATIONS FOR STOCKING
Reserve Area on Same Floor as Selling Area
NEW GROCERY HANDLING — NEEDS ONLY FIVE OPERATIONS FOR STOCKING
Reserve Area on Same Floor as Selling Area

FIGURE 2: Part (A), top, normal one-floor operation. In Part (B), bottom, sales floor stocking is gone.

HOW BULK BEHAVES

Progress in the development of a quantitative basis for evaluating conditions in bulk handling systems, under study for several years, is reported here in the form of simple formulas—evolved to help an engineer design for a desired flow. Discussions on the various pressures, obstructions and effects encountered in bulk handling lead to the introduction of the "Flow Factor", a new concept which will be fully covered in next month's conclusion of the report.

By A. W. Jenike,
A.S.M.E., Consulting Engineer,
Salt Lake City, Utah.

INCREASED mechanization in the handling of bulk solids has constituted one of the more significant industrial trends during the past several years. And since any arching, hanging-up, or sticking of material may disrupt the operation of an automatic system, it is increasingly important that engineers know more about the flow of solids through bins, hoppers, feeders and spouts.

Until now, the only sure way to predict how a material would flow has been through a full-scale test.

On a repeat design for the same material, experience provides reliable information.

However, when it comes to designing for a new material, or when capacities or shapes of bins are unlike those used in the past, the engineer can do little more than make intelligent guesses.

The result may be a plant either over-designed (with unnecessary capital outlay) or under-designed (with resulting need for unnecessary manual labor). In the latter case, alterations may then be required—and these are always expensive.

The elimination of guesswork and the placing of design for flow on a quantitative basis has been a project on which the author has worked for several years. This is a report of results obtained to date.

Two New Factors Evolve

To obtain a quantitative basis, the concept of the "flow factor" of a material has been developed by the author. The flow factor is the ratio of peak compressive strength to unit weight of a material as a function of the ratio of compacting pressure to unit weight.

Physically, the flow factor is the radius of the largest circle over which the compacted material can form a stable dome. For the purpose of classification, the flow factor can be described by a symbol, like C 1.6. This relation varies with the surface condition of particles of a material; thus, it varies with moisture content.

In the case of fine or flaky materials flowing through very steep hoppers, it is also necessary to introduce the concept of the "pressure factor," which determines the elastic properties of the material.

The quantitative method will affect the designing of bulk-handling plants in the following way: The handling system of a plant will be planned to a predetermined flow factor.

Magnitude of the flow factor will depend on the material in question and on the conditions under

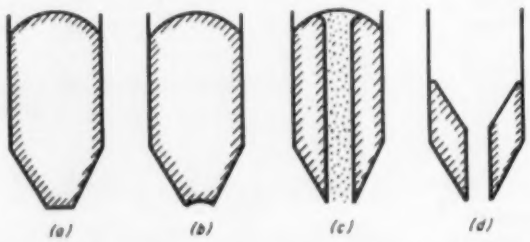

FIG. 1: Typical obstructions to flow of bulk material.

which the plant is to operate. When fully automatic operation is desired, unfailing flow is mandatory—and the plant will be designed for the condition of lowest flowability. However, this may lead to an excessive capital cost, and a compromise may be necessary. Either manual labor will be used when low flowability material is processed, or, as may be the case with coal in a power plant, the material of inferior flowability will be excluded from the plant.

Whatever the objective of the design may be—unfailing flow or occasionally assisted flow—a quantitative method of design, based on measured flow factors, will allow the engineer to design consciously for that objective.

Typical Obstructions To Flow

Figure 1 shows the typical behavior of a bulk solid in a bin composed of a vertical and a sloping portion. The latter will be referred to as the hopper. The outlet of the bin is at the bottom of the hopper and provided with a gate or feeder. Let us consider events as they take place when material flows through the bin:

(a) The gate is closed, and the bin has been filled. Material was loose at the time of filling, but it has compacted under its own weight and under the impact of the falling particles.

(b) The gate has been opened. Material in the shape of a dome, deprived of support, fails and drops out of the bin. If a feeder replaces the gate, the same thing happens except that material is removed more gradually. As a result of the change in the support of the mass of the material, a redistribution of pressure takes place. An arching effect develops in the vicinity of the opening.

Now, either of two things can happen:

1. If pressure in the arching material does not exceed its strength, there is no flow—an obstruction referred to as "doming" has developed.

2. If pressure within the dome is larger than the strength of the material, the dome disintegrates and material begins to flow, **(c)**. The process of disintegration proceeds upward through the mass. The flowing core is in the shape of a vertical funnel gradually widening out at the top of the filling.

Material flows into the funnel from the top of the

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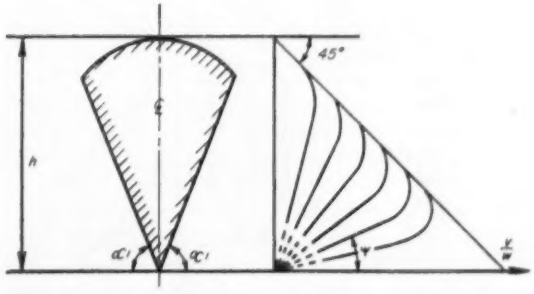


FIG. 2: Typical distributions of pressure in a hopper.

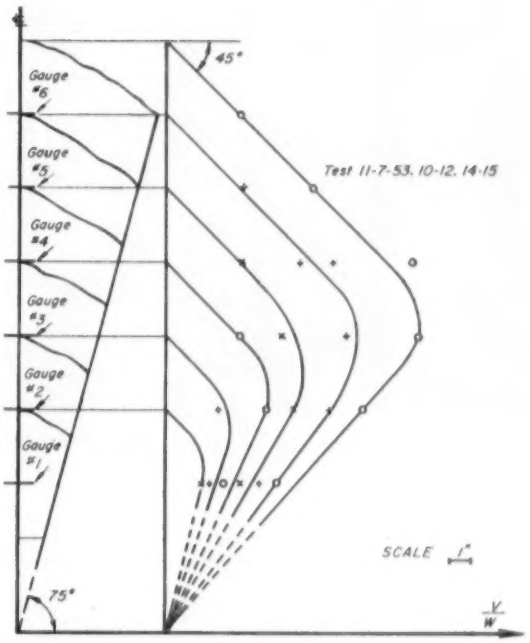


FIG. 3: Measured values of unit pressure in a hopper.

If *it can be established* by experience that the "flow factor" of any material can be reliably evaluated by simple means and then this value can enable an average material handling engineer to predict whether the material will flow out of a given bin or hopper, it will be quite useful. It will prevent the possibility of installing discharging apparatus in a bin just to be on the safe side, when actually the material would flow out successfully by gravity. I gather . . . that the above things have not been established by experience, but the author thinks they could be.

However, if the value of the "flow factor" of some material should turn out to be such that the material would not flow out by gravity from any bin or hopper of reasonable design (and there are many such materials) the article does not offer a practical solution. That is where manufacturers enter the picture with bin dischargers that do the job in spite of bad "flow factor".

A. D. Sinden, Chief Engineer, Stephens-Adamson Mfg. Co.

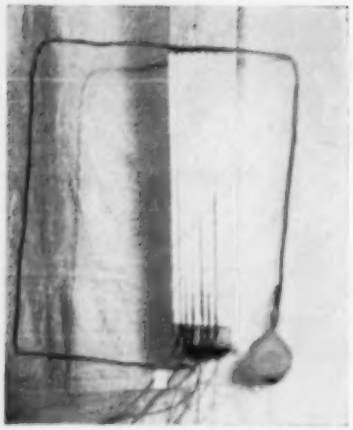


FIG. 4: Test hopper and gauges.

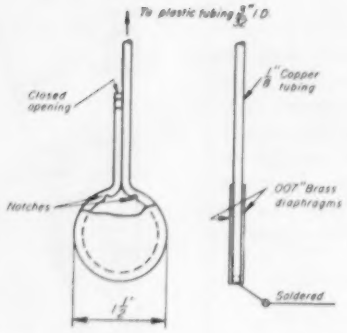


FIG. 5: Details of a pressure gauge.

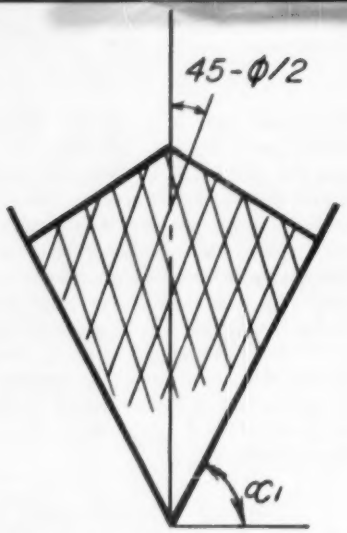


FIG. 6: Lines of shear of material.

HOW BULK BEHAVES

Continued

bin where it has been least compacted. This is the case of "funnel flow," which occurs in hoppers that are not very steep.

In bins with very steep hoppers, the core funnels out within the hopper to include all the material in the bin. This is the case of "mass flow." The whole mass of material moves down simultaneously. It can be described as follows:

Stationary material around the flowing core undergoes a wedging action within the hopper. If walls are very steep and smooth, that wedging action is strong. Wedging action is counteracted by a horizontal pressure from the flowing core. The core can be considered a material separate from the stable mass on the outside. It has been known that in a tall, vertical bin pressures are practically constant at depths greater than 2.5 diameters of the bin, and that pressures are proportional to the diameter of the bin. The stronger the wedging action in the stationary mass, the higher must be the counteracting pressure from the flowing core—and therefore the larger the diameter of the core until it fills out the whole bin.

Design Anticipates Sequence

As flow progresses, the level of the filling drops gradually. In the case of funnel flow, two things can now happen—either all material flows out of the bin; or, as the level of material drops, more compacted, stronger material emerges at the top and refuses to flow down the funnel. The core empties out and, providing the stable material can withstand the pressure

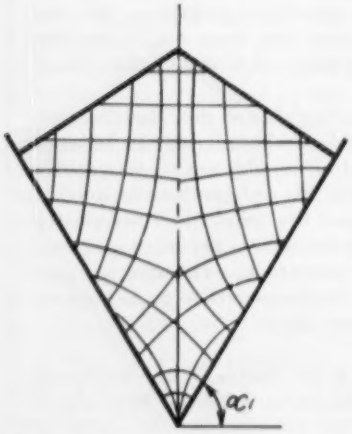


FIG. 7: Expected pattern of principal pressures in a hopper.

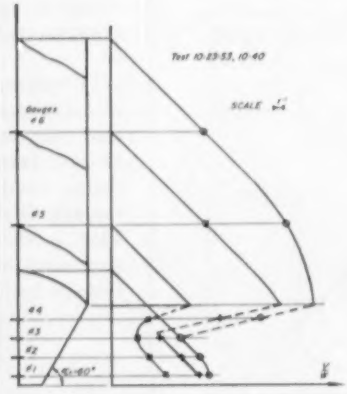


FIG. 8: Measured values of representative unit pressure in a test bin.

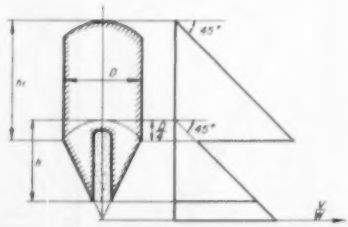


FIG. 9: Doming at elevation of transition from vertical portion of bin.

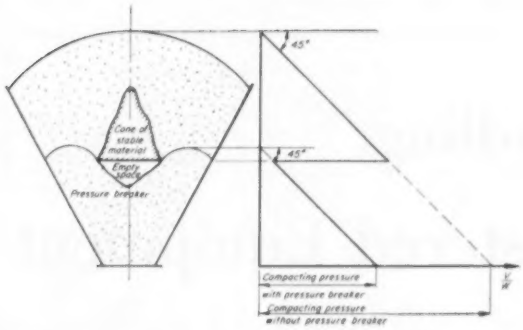


FIG. 10: Pressure breaker helps support material above it to reduce compaction, allow flow.

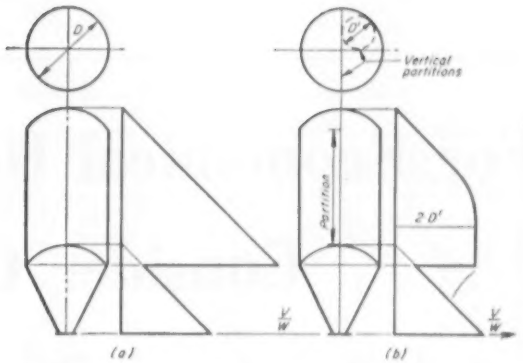


FIG. 11: Influence of a partition in a bin on pressures. Effective diameter of bin is reduced.

imposed by the wedging action, an obstruction develops **(d)**. This is called "funneling." As a result of the wedging action, material contracts toward the center of the bin, and a gap often can be seen between the material and the vertical walls of the bin.

It should be noted that when material disintegrates and flows it loses its strength. If that material becomes stationary again, it re-compacts under the pressure prevailing at the new point and gains the strength corresponding to the new pressure.

The sequence of flow, as it has just been described, is only one of an infinite variety that can and does take place in the flow of material through a bin. It is seldom that a bin is filled right up and then emptied out completely. Usually, some material is drawn out and other added. The level fluctuates up and down. In order to design a bin for unobstructed flow, it is necessary to determine the sequence most likely to lead to an obstruction, and design for it.

Distribution of Pressures

As material is fed into a bin, pressures develop within the material, and, under the action of the pressures, the material builds up strength. The strength developed at any particular point is a function of the largest pressure at that point. Thus, if we are to know about the strength of the material, we have to know about the distribution of pressure within it.

A mathematical evolution of a general formula for pressure in bulk solids in a bin does not seem possible to the author. The reason is that a solid in a bin is partly in Rankine state of plastic equilibrium[2] and partly in an elastic state. Furthermore, neither the modulus of elasticity of a bulk solid nor its Poisson's ratio is constant. Therefore, it is necessary to proceed on an empirical basis.

The pressures that now will be considered are those occurring prior to the opening of a gate or starting of a feeder. They may be due to weight of material

[2]"*Soil Mechanics in Engineering Practice*," by *Terzaghi and Peck*, 1948.

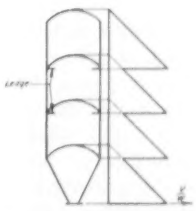


FIG. 12: Influence of horizontal ledges in a bin on pressures.

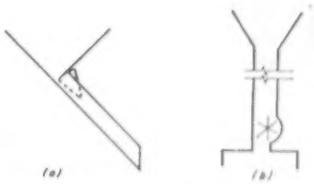


FIG. 13: (a) Arrangement of normally empty chute; (b) normally filled spout.

("static pressure"), impact of falling material (impact pressure), and vibration of the bin (vibrational pressure).

Static pressure varies throughout the mass of material, not only with elevation but also with lateral position in the bin and with direction. The knowledge of all pressures at all points is not necessary for the development of the conditions of flow. What is necessary is the knowledge of pressures in the planes along which material fails and flows when the gate is opened or the feeder started. These planes vary somewhat between bins and materials. Therefore, for the purpose of classification and comparison, the vertical pressure, v, along the centerline of the bin is chosen as being representative of the pressure pattern in a bin. It is expected—and assumed—that in a given bin the representative pressure may vary with material, but all materials that have the same representative pressure also have the same pressure pattern throughout the mass.

Pressure in Hoppers

First of all let us consider the representative pressure, v, in a hopper, *Fig.* 2. The diagram shows a family of curves which represent the possible distribu-

(*Continued on page* 119)

For Economical Handling, Consider Castered Equipment

By Edward L. Lee
Caster & Floor Truck Manufacturers' Association

PROPER selection of casters for use on industrial mobile equipment—either of standard makes or specially designed in a company's own shop—can be of far greater importance to efficiency and economy in material handling and other factory applications than many companies may presently realize.

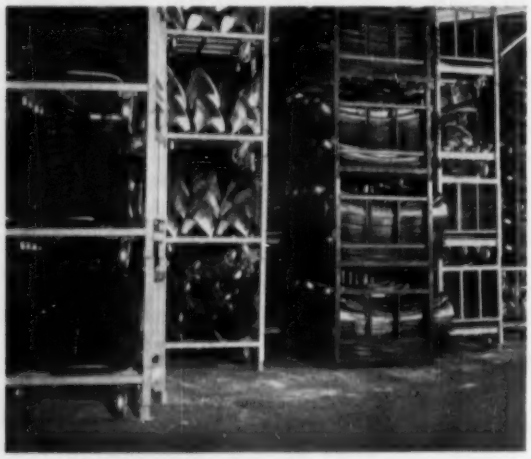
Castered vehicles provide as economical a means for material handling as has ever been developed; and properly applied castered equipment will minimize physical effort at the same ratio as any other type of material handling equipment. The most efficient materal handling systems are those integrating castered equipment with other types of material handling equipment, such as conveyors, cranes, powered lifting and rolling equipment, etc. An excellent example is one where castered vehicles are coupled in train by power for maximum handling at minimum cost.

While this report is not intended to indicate that castered equipment is a cure for every handling problem, it is designed to indicate the broad range of possible uses, and even to make it evident that other types of costly equipment are frequently used where caster applications would be considerably more economical and efficient.

Definition of a Caster

By definition, a caster consists of one or more wheels mounted in a caster assembly which has a top designed for mounting to the base of a truck, dolly, cart, rack, or even to a product itself in process of manufacture. The caster assembly may be designed as a non-swiveling (rigid) or as a free, horizontal swiveling unit.

SOME SPECIAL CASTER APPLICATIONS



STACKING RACKS are equipped with casters to make individual units portable when they are not stacked.

HUGE SHOCK-ABSORBING casters serve as running gear on dollies used to move bombers in assembly line.

Classes and Sizes of Truck Casters

Casters should be classified in groups according to recommendation for their selection and use as follows:

General Duty Class	Approx. Wheel Diam.	Approx. Tread Width	Approx. Operational Load for Cushion Tread
Light	2" to 5"	¾" to 1"	75 to 150 lbs.
Light Med.	3" to 6"	1-¼"	100 to 300 lbs.
Medium	3" to 8"	1-½"	125 to 325 lbs.
Med. Heavy	3" to 8"	2"	200 to 500 lbs.
Heavy	4" to 10"	2-½"	450 to 650 lbs.
Extra Heavy	4" & up	2-½" & up	450 lbs. & up
Trailer	8" & up	3" & up	700 lbs. & up

NOTE: The load rating is a generally-recommended operational load rating for each caster under normal operating conditions, expressed in pounds and including a factor of safety for overload.

The upper part of the caster assembly may be either a flat mounting plate for attachment by screws or bolts, a stem or other means used to attach the caster to the equipment. The lower part of the caster assembly—the horn assembly (or fork)—has an axle between its legs with the wheel or wheels riding upon the axle. Casters that swivel commonly use a bearing assembly to reduce turning friction. Many casters also use bearings between the wheel and the axle.

Types Of Casters

While caster classification covers a broad field of applications, such as household, institutional and industrial, this report will concern itself only with the latter or industrial group of the duty classifications as follows:

Medium-Heavy-Duty. These casters are designed to perform under conditions normal to manufacturing and warehouse material handling facilities and are of commercial anti-friction ball and/or roller swivel bearing design for manual (2½ to 3 MPH) operations.

Heavy-Duty. These casters are designed to perform under conditions normal to heavy-duty manufacturing and warehouse material handling facilities and are of commercial anti-friction ball and/or roller swivel bearing design for manual and power-drawn operations up to 3 MPH.

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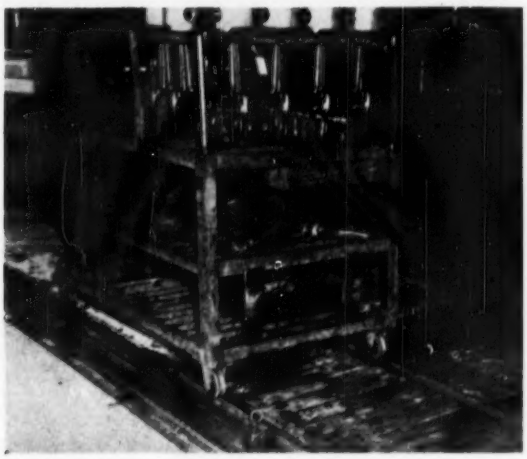
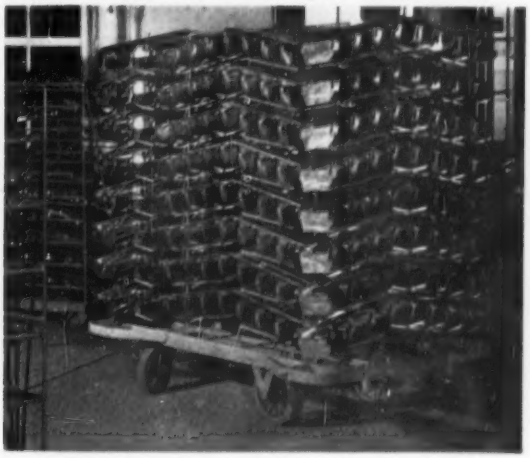


GROOVED-WHEEL casters on rack-type frame run on tracks for servicing assembly or production lines.



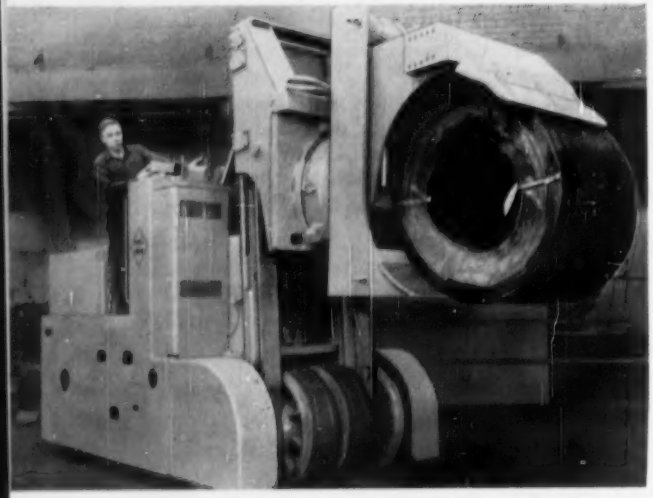
SPECIAL RACKS are shown mounted on castered frames. They can be moved individually or together.

SPECIAL TRUCKS

FOR HANDLING

SPECIAL JOBS

By Sheldon K. Towson, President & General Manager, The Elwell-Parker Electric Co.



COIL HANDLER moves steel in horizontal or vertical plane. Truck engineered with special rotating clamp which engages material set upright or on its side.

ADAPTATION of "reverse" acting mast to standard truck permits carrying loads for lowering below floor level—for such purposes as quenching job shown.

FOR handling jobs that cannot be economically mechanized in any other way—and for further reductions in the cost of handling by industrial vehicles—more and more firms are requesting specially designed equipment.

The idea of "specials" in industrial trucks is not new, but interest in them is growing as industries look for every avenue of economy in production.

It should be stressed, at the outset, that specials are not intended to replace standard models. Rather, they supplement the "standards". And, of course, not all companies can make economical use of specials—but many can and do.

For purposes of this discussion, industrial trucks may be conveniently divided into three general classes:

1. Standard trucks utilizing only those basic features commonly associated with such equipment.

2. Standard trucks equipped with interchangeable attachments or accessories to increase versatility—rotating heads, clamps, booms, scoops, rams, etc.

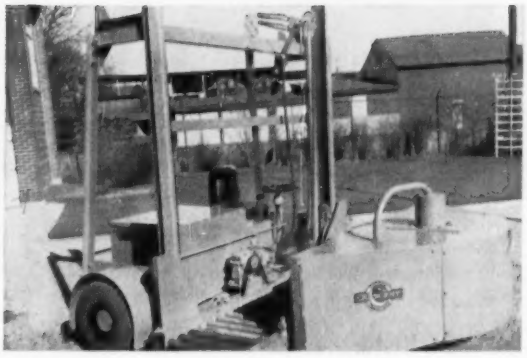
3. Trucks incorporating a series of attachments or accessories, or of altered design, to accomplish a desired objective.

Vehicles which fall under the definition of Class Three may be considered as "special".

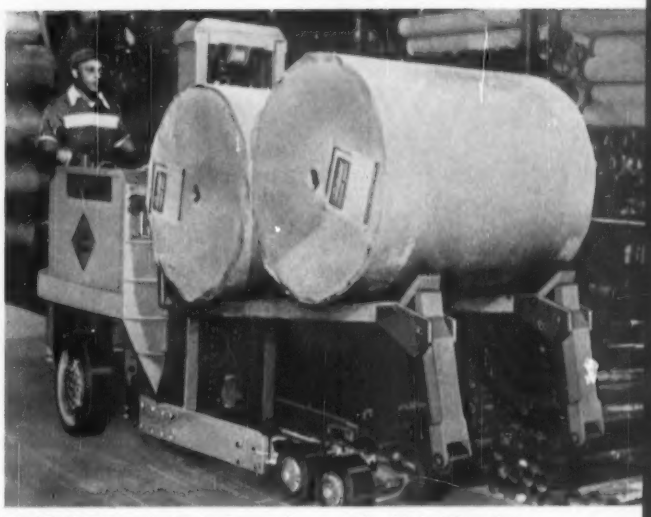
One point is particularly important. Applicability of specially designed trucks is not confined to either big plants or small plants alone. Their function is twofold: (1) for one specific job that is continually repetitive; or (2) where a truck may be adapted to handle a variety of jobs, thereby saving a company the cost of several vehicles which may not, individually, be utilized to the fullest of their capabilities.

Measuring Sticks for "Specials"

Following is a check list designed for measuring industrial truck adaptability in a plant. If a study indi-



DEVELOPED to handle rugs in and out of storage, unit has hydraulic control for lifting, side-shifting, and movement of powered rollers of conveyor section.



EQUIPPED with forks hinged at ends, high-lift platform truck picks up, delivers, unloads paper to scattered printing presses, handling forty rolls per hour.

cates that additional savings are possible with a specially designed unit, consultation with an industrial truck manufacturer probably will lead to the desired design and ultimate economy.

Areas of application for "specials" include:

1. Handling Loads Which are Awkward, Irregularly Shaped, Bulky, Etc.:

Where loads are such that they may not be effectively handled by standard trucks, "specials" are often called upon to do the job. Cost savings under such circumstances are usually marked.

2. Adaptation of a "Special" to Specific Plant Operating Conditions:

Oftentimes a truck may be desired for a job in the production process—for example, placing raw material and removing fabricated parts from a machine. If a standard truck cannot match the needs and the output of such a machine, a "special" may be the only means of utilizing the full, normal capacity of the equipment.

3. Adaptation of "Specials" to Plant Limitations:

Such factors as limited floor load capacity, limited ceiling heights, limited area for maneuverability, etc., may call for specialized equipment that can overcome these conditions and achieve maximum output from the truck and highest possible savings from the operation. Thus, "specials" may eliminate the need for more costly plant or operating alterations.

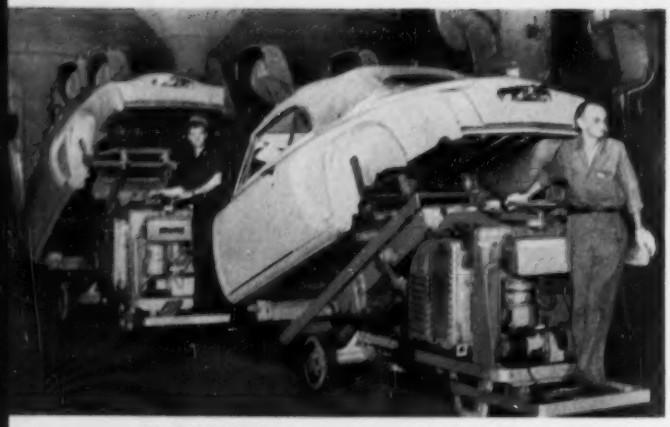
4. Use of "Specials" to Mechanize Manual Operations:

It has already been noted that specially designed trucks may be able to mechanize handling where standard trucks cannot do the job, or vehicles equipped

(More on next page)

CLAMP and side shifter for palletless handling. Carton rests on lower shelf, is secured by rubber-lined upper arm. Hydraulic controls are at the cab position.

DESIGNED to handle 56-inch diameter pipe, truck straddles ditch and lowers each 40-foot section into place. Each section of pipe weighs some twelve tons.



ENGINEERED to move car bodies from assembly to scattered storage areas, 3-wheeled truck works with racks to upend bodies and triple storage space.

DIE-HANDLING truck has push-button control for placing, removing 4000 lb. dies. Laterial movement of boom shieve gives hoist 3 motions for spotting dies.

DRUM handler takes four per lift; is used here to unload drums from conveyor and set them on pallets so that they can be handled by conventional fork truck.

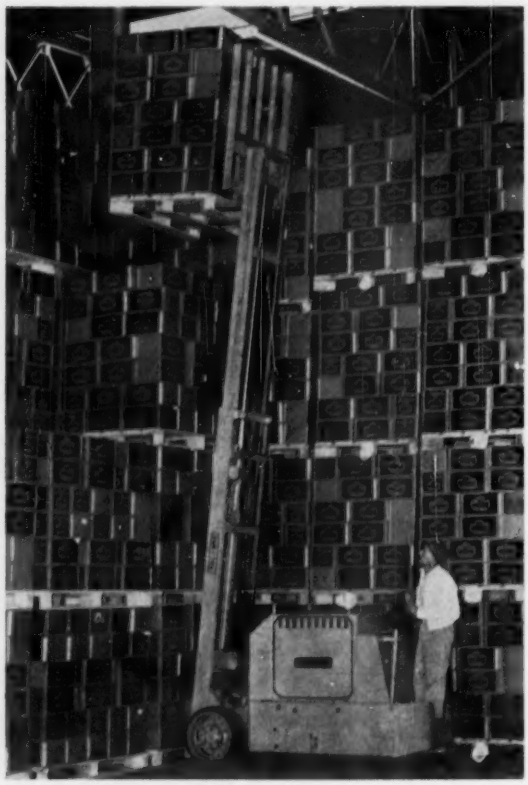
with attachments or accessories are not feasible. A "special" may very likely solve the problem with an expectancy of a sizeable return on the investment.

5. Increased Safety Through "Specials":

In addition to difficult-to-handle loads, specially designed trucks may also be employed to increase safety both for operators and loads. In this case, the function of the equipment may not be altered for the operations themselves, or with thoughts of increased economies, but for safety alone.

6. Reduction of Maintenance Costs of Trucks Operating Under Severe Conditions:

Many times, a standard truck may be able to perform difficult tasks. However, severe operating conditions (heat, punishing floor surfaces, etc.) may take a heavy toll of the truck itself. Accordingly, a specially designed truck may be built to withstand the rigors of the operation. As with safety, while the function is standard the design is special in that the vehicle may have such features as an extra large drive axle, a more durable frame, and guards to protect it from heat.



HIGH-STACKING fork truck, used by Owens-Illinois Glass Co., is applicable to utilize all space in warehouses with extremely high ceilings, lifts to 221 inches.

POWERED WRENCH built on truck platform closes dump gates of iron ore rail cars—one man now does, in seconds, job which formerly required four men.

HINGED PLATFORM operated by winch back of uprights dumps briquettes from drying rack. Loaded rack is automatically secured to platform when picked up.

7. Elimination of Additional Handlings:

The more tasks that can be performed by the same truck, the more time that will be saved, the less physical effort that will be required, and in total, the greater the savings that will be realized. As noted previously, "specials" are very often employed to perform a number of different jobs. Not unimportant is the freeing of other handling equipment to do jobs for which they were originally designed.

Positive Tests for "Specials"

The above check list may be all that is necessary for spotting inadequacies or opportunities for savings in a company's handling methods. However, a careful study

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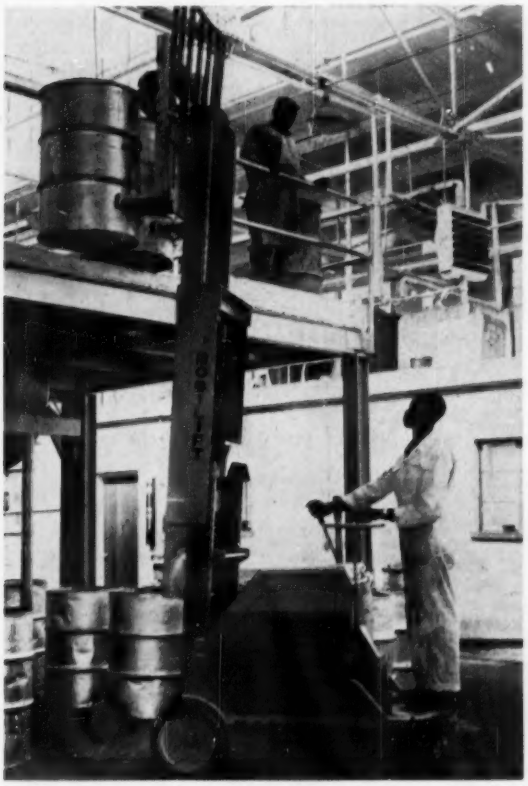
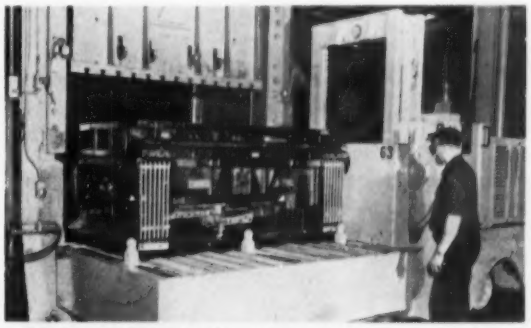


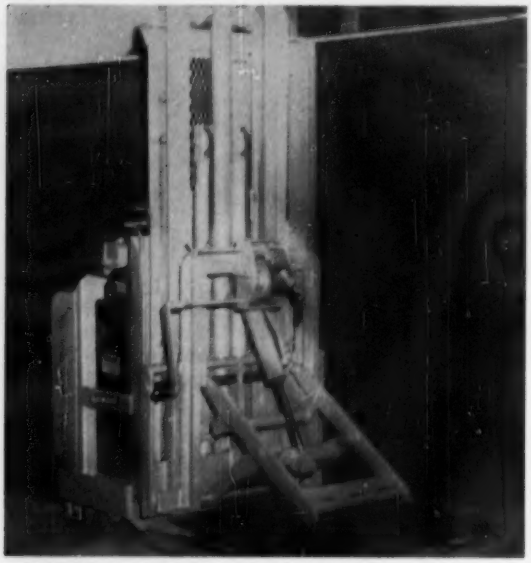
TWO barrels or drums, palletized chemicals, handled by truck in receiving, shipping and supplying chemical tanks 10 ft. off floor of textile plant.



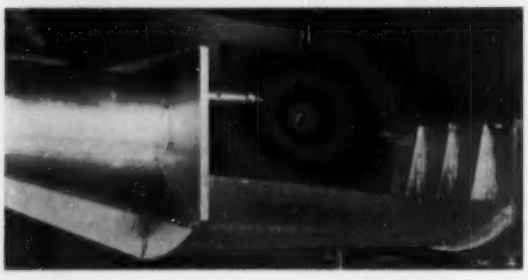
SIDE-LOADING die-handling truck engineered for Ford Motor Co. Buffalo stamping plant has 40,000 lb. capacity, is shown loading a big die into 400 ton press.

FOR "PIGGY BACK" operations (highway trailers carried on rail cars) this can approach trailer from any angle, maneuver it up a ramp and spot on the car.

Continued



MODIFIED to handle dies to 3000 lbs., truck works in confined areas; has push-pull bar on forks for placement; uses chain secured by bar teeth for removal.



of potential savings must be the deciding factor because—in the final analysis—it is the need for reduced operating costs that initiates the consideration of a "special". If the problem is safety, a solution will result in fewer indemnity claims. If restricted headroom is troublesome, the solution will mean more efficient use of storage space.

The information necessary to forecast accurately the resultant savings from a specially designed industrial truck is available from a number of sources. A company's own operating records are most important. Time and motion studies can supply additional information. A valuable source of information is, of course, the truck manufacturer himself.

Case Histories of "Specials" Applications

Let us take a look at some examples which show how specially designed trucks have overcome specific handling difficulties.

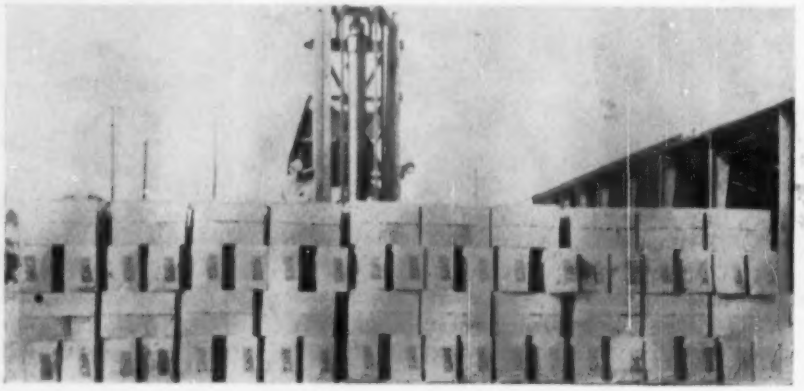
Problem: A major steel producer was required to lift, revolve and transport giant, 15,000 pound coils of strip in varying widths and diameters. Ram trucks, commonly used for coil handling, would not permit handling in both horizontal and vertical positions.

Solution: The answer was the engineering of a truck having a special coil clamp with a rotating feature to permit picking up and handling coils in either horizontal or vertical position. Coils are clamped just hard enough to hold them but not hard enough to cause damage.

Problem: One of the automobile manufacturers urgently needed an economical and efficient means of moving auto bodies from their initial assembly points to widely scattered storage areas. The problem was complicated by the need for subsequent delivering to final assembly areas. Speed and dependability were chief factors.

(*Continued on page* 177)

LEFT: Specially built for Alcoa, unit has 18 ft. boom, power steering; transports 1500 lb. pigs, held by hydraulically operated prongs, to feed furnace.



TEN 48x48 pallets are handled simultaneously by fork truck which manages 320 cartons of produce per lift. Firm unloads 160 trucks per day.

What's Wrong with Material Handling?

By Byron W. Saunders
Associate Professor
Sibley School of Mechanical Engineering
Cornell University

Byron W. Saunders

A NEGATIVE ATTITUDE toward Material Handling certainly is not justified. But some honest self-appraisal and constructive criticism seems to be in order if we are to maintain the dynamic progress that has been recorded in the last ten years.

Although Material Handling, as a field of industrial engineering, has come of age, it can yet make a more telling contribution to the industrial progress of America than it has in the past. A person, a company, a science, or an art cannot maintain the interest of progressive people if it stays at a fixed level. It cannot become static; it must not become satisfied with the status quo. It has to be a moving, dynamic force to attract people to it and to stimulate within itself the desire to improve, to enlarge, to make more scientific, —in short to become an increasingly useful force for industry and commerce.

This, then, is in the nature of stock-taking. It is not an attempt to be critical for criticism's sake. We hope that through self-appraisal we can chart the course that we all must take to maintain and increase the impetus so far achieved.

While much is wrong with Material Handling, there is also much that is right. Some of these "right" things follow:

1. Publicity and activity in the field of Material Handling have made industry and commerce suddenly cognizant of the problems and costs of handling. The result has been a greater awareness of the problems to engineers and managers alike.

2. The organization of societies such as AMHS and SIPMHE has contributed to a better understanding of and attack on some of the problems of Material Handling. A revitalization of the Material Handling division of the ASME has likewise helped in this regard and aided in publicity.

3. The forthcoming Material Handling Handbook jointly sponsored by the ASME and the AMHS is a big step and a good one.

4. Trade associations such as the CEMA, ITA, and MHI have become strong and active. They have their own educational programs and have encouraged others in educational activities which have contributed to the dynamic growth in the field.

5. The College-Industry Committee for Material Handling Education has initiated projects which will become more meaningful as their work is more widely known and the output of the committee can be more clearly measured.

6. The stimulation of prizes and the interesting of larger numbers of people in the field through such means as the Clark Equipment Company and Wunsch Foundation awards have all added greatly to Material Handling progress.

It is through such things as these that much good has been achieved—and that Material Handling has not become stagnated but is a moving and dynamic force in our American economy today.

New Tack Needed

In spite of the progress of these past several years —progress which has been quite pronounced—many of the things that have happened, and the results ob-

(More on next page)

This discussion includes the essential thoughts expressed in a panel meeting on the Cornell University campus during the Industrial Engineering Seminars held June 15-18, 1954. Participants on the panel were:

Mr. George S. Smith—Manager of Material Handling for the IBM Corporation at Endicott, N. Y., and immediate Past President of the American Material Handling Society.

Mr. Harry C. Keller—Manager of Engineering for the Lamson Corporation, Syracuse, N. Y. and Past Chairman of the Material Handling Division of the American Society of Mechanical Engineers.

Prof. Harry J. Loberg—Director of the Sibley School of Mechanical Engineering at Cornell and current Chairman of the Material Handling Division of the American Society of Mechanical Engineers.

Prof. Saunders—Associate Professor of Production Engineering at Cornell, Member of the College Industry Committee for Materials Handling Education, the American Material Handling Society, and the Material Handling Division of the ASME.

tained, have been only superficial in nature. The science per se has not been advanced as much as the years involved should have allowed. The field of Material Handling can not long endure on superficial progress. It has got to get its second wind and take a new tack to arrive at the goal many of its ardent supporters feel that it should have.

What is the answer? What is necessary? By answering these questions in part, we are saying by implication what is wrong. Without an attempt to put the following comments in any particular listing, or order of importance, here are some of the things wrong with Material Handling as it is practiced today.

1. Costs Not Understood

A great many informed Material Handling people are concerned over the fact that handling costs are too high. This is not necessarily bad. It is possible to justify material handling costs—and at a rather high level. What should, instead, interest handling people is total costs.

Material Handling costs are merely one increment of total cost, and it is total cost that determines profit. We should understand the effects of material handling practices on profits and total manufacturing and distribution costs. This means, then, that Material Handling people have got to be more conversant with costs on things other than Material Handling. We must know costs on idustrial processes and understand them. We must know and understand inventory costs, purchasing costs, distribution costs, and general transportation costs.

What is required, actually, is a more profound understanding of cost systems, accounting procedures, equipment policies, equipment replacement theories, and industrial economics generally.

2. Too Little Comprehensive Knowledge

There are too many "hardware" dealers in the business and not enough people who are interested in the totally integrated purchasing—production—distribution cycle. No castigation of the true hardware dealer is inferred here at all—rather, too many Material Handling people are so interested in equipment for equipment's sake that they lose sight of many of the other peripheral problems associated with the handling business.

To do a more effective job of handling, our Material Handling people must be more conversant with things over and above material handling alone. We must be interested in what happens before and after a specific handling takes place. A knowledge of production processes in a wide variety of industries is necessary. Knowledge of materials and their characteristics, both physical and chemical—under a wide variety of conditions—is necessary. Inventory control is a vital part of the total production chain.

3. Standardization is Slow

Some will say that there are now Material Handling standards. Perhaps so—but at best they are weak.

The work so far done in the formulation of Safety Codes for conveyors and cranes is a small step in the right direction. The history of American industrial progress is, in large part, the history of effective standardization. Who really knows, for instance, what is meant by a statement that a fork truck has a 4000 pound capacity and a 15 inch load center. Presumably, that is a minimal value, but it is hardly sufficient for a user who wishes to make an honest comparison of values. There are no comparable standards in the industry that are effective measures or comparators of design and performance. All equipment has to be identified pretty much by itself. This, then, is one area of standardization that is necessary—on the equipment itself.

Another area of standards required is in the performance of the equipment. There should be some form of standard tests to which all equipment with a given rating should adhere. Competitive equipment should have standard specifications that mean something for the prospective purchaser, so that he knows quotations he is receiving are for the same thing. It is not necessary for such equipment to have standard performance characteristics. Competitively, it would be far better if they didn't. However, each piece of equipment should have standard operating characteristics and standard performance data which are available to potential users.

Such standards in the industry and the availability

(Continued on Page 125)

Revolvator Reviews 50 Years of Progress

CONTRAST MODERN REVOLVATOR, used in the servicing of famous jet fighter-bomber (top), with early unit loading rope onto horse-drawn wagon (left).

IN marking its 50th anniversary this year, Revolvator Company recalled its founding at the turn of the century when the science of material handling, as it is applied today, was unknown. Then, vertical movement of loads necessitated brute strength, or at best, a cumbersome block and tackle suspended in a fixed location. Warehouses were spacious; aisles, where they were defined, were wastefully large, as there was no stacking to the ceiling with machinery or maneuvering loads in small areas.

About that time, Henry S. Germond, Jr., destined by family tradition for a career as a stock broker, struck out for himself to serve industry. Realizing that mechanical devices for handling materials not only eased the lot of the employee, but produced savings for the employer by reducing lost time, injuries and the percentage of damaged goods, he turned his activities to the New York Revolving Portable Elevator Company, parent of the Revolvator Company.

Here, he developed the revolving base portable elevator which many felt to be the key to the solution of the stacking problem. His basic principle is still of paramount importance today.

With the introduction of the powered lift truck to industry, some said progress would leave the portable elevator behind. But, today there appears to be an increasing number of operations in which the smaller, relatively less expensive portable elevator is required, especially where the work is seasonal or intermittent and does not warrant a large expenditure for equipment.

So, on its 50th anniversary, we salute Revolvator Company for its contributions to the science of material handling!

PATENT REVIEW . . . . . By Melvin Nord, Patent Attorney

Each month in these pages, some of the more significant new patents related to material handling will be reviewed. The reader can thus keep abreast of the latest developments almost as soon as they're off the drawing boards.

Conveyed Material Floats on Air

FLOATING on air aptly describes material which is transported by an unusual type of conveyor for moving flat objects such as sheet metal, lumber, building plates, etc. The conveyor is illustrated in accompanying Figures 1, 2 and 3.

Figure 1 shows, in vertical section and on an exaggerated scale, an object (1) resting on an air film (3), with internal overpressure effected by blowing air from below a conveying path (4) provided with perforations (5) of small hydraulic diameter. The air is evacuated to the surrounding atmosphere by flowing in the manner shown by the arrows (6).

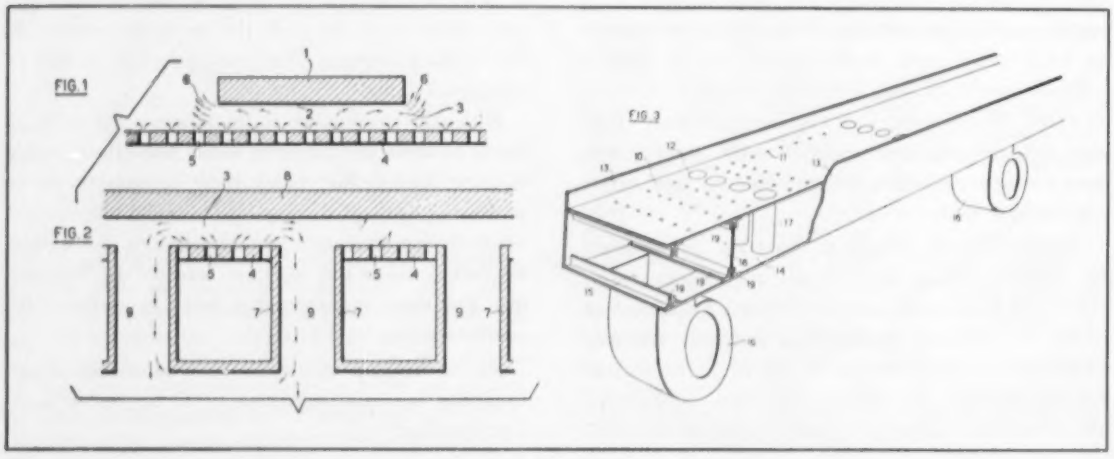
The overpressure of the air film is determined by the weight of the object, and its pressure represents the force with which the air is blown out. In order to keep consumption of air to a minimum, the air film, or floating height, should be kept thin. Factors affecting the floating height are: weight of the object, the size of the lower surface (2), the hydraulic diameter of the perforations, their grouping in the conveying path, and the possibility of evacuating the air, as well as the pressure with which the air is blown.

The conveying path in Figure 2 consists of pressure cases (7) for air being emitted through the perforations (5) toward the object conveyed (8), shown here in longitudinal section and consisting of a paper-web cardboard sheet. Between the pressure cases, there are formed channels (9) extending through and interrupting the conveying path for the evacuation of air.

Figure 3 shows a perspective view of a conveying path of another embodiment of the invention. The conveying path (10) is provided with upright side flanges (13) and forms the roof of a long pressure chamber (14) which is supplied with compressed air through the openings (15) in the bottom plate of the chamber from one or more motor-driven fans (16). The interior of the chamber is divided into smaller chambers by transverse walls (18).

Movement of objects is effected by arranging the conveying path with an inclination of some degrees, thus causing the items to slide on the air film in the direction of movement. Another method is to blow out air jets in the direction of travel.

U. S. 2,678,237, issued to Claes G. Allander and Sven W. Wallin, assigned to A. B. Svenska Flakfabriken.



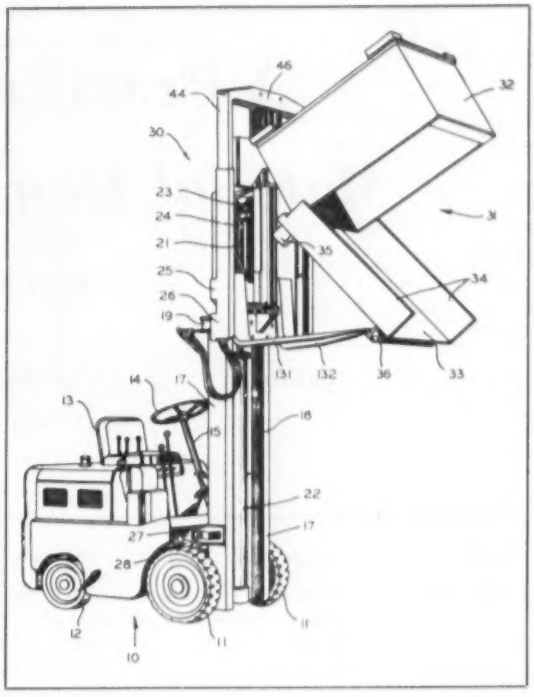
Lift-Dump Attachment

DUMP-BOTTOM type hoppers can be easily emptied by fork trucks with a lift dump attachment developed especially for this purpose. The drawing at right shows a hopper which has been lifted and the bottom opened for dumping.

When contents of a loaded hopper are to be dumped, the fork truck is aligned with the hopper, and the load-supporting forks (131 and 132) are inserted below the platform (33) between the legs of the hopper (35). The hopper (31) is then raised to an elevated position by selectively admitting fluid under pressure to the lower end of the cylinder of the truck's hydraulic assembly (22).

After the hopper has been elevated to the desired height, fluid under pressure is admitted to another cylinder which causes the inner channel top brace (46) to be raised. During upward motion of the back of the hopper body (32), the forward portion of the body pivots up and away from the platform, permitting the load to be discharged.

U. S. 2,678,742, *issued to Wesley Zorn, assigned to Clark Equipment Company.*

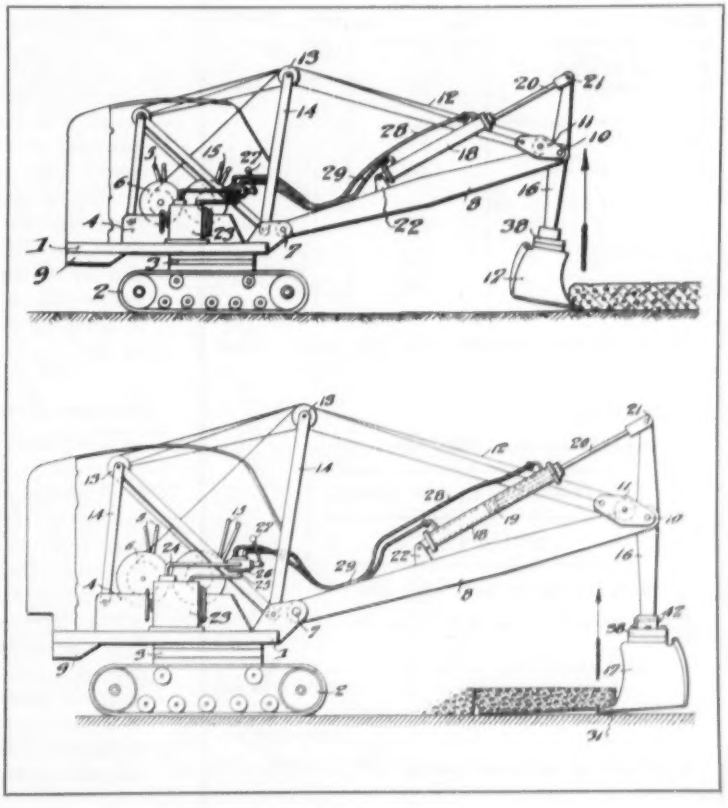


Combination Shovel-Hoe

CONVERSION of a power shovel to a hoe has been simplified by a swivel head which permits reversing of the bucket. The bucket is swiveled at one end of the shovel handle, so that reversal can be easily and quickly accomplished by releasing and rotating the bucket through 180 degrees without disassembly.

The upper drawing at right shows the bucket adjusted for use as a shovel; the lower drawing shows the bucket reversed for hoe work. The reversal of the bucket is accomplished by a swivel head (38) on the shovel handle (16). When it is desired to reverse the bucket, a locking pin (42) is removed, the bucket is rotated through 180 degrees, and the locking pin is inserted again.

U. S. 2,678,140, *issued to William J. Goetz.*



A Practical Manual of
Material Handling Procedure

Installment 6

Section 7 **ANALYSIS OF IN-PROCESS HANDLING**

By Robert C. Brady

PART	: Simplex Shoe CONTROL NO: 16644
OPERATION	: Punch hole and countersink - (1) hit. Use tongs to handle piece. Oil die 1 of 10 pieces.
MACHINE	: Minster punch press.
OLD METHOD	: Working from wooden box.
NEW METHOD	: Working from hopper bottom box and stand.

ELEMENTS	OLD METHOD	NEW METHOD
Pick piece from box and grasp w/tongs	.040	Eliminated
Grasp piece w/tongs and position in die	.033	.045
Hit (Machine Cycle)	.042	* .042
Remove piece from die and drop in box with tongs	.043	.043
Oil die 1/10 pcs.	.012	.012
TOTAL	.170	.142

* Part picked from positioning stand tray during machine cycle and held.

CONCLUSIONS:

1. Hourly Production at 150% efficiency.

OLD METHOD	NEW METHOD
529	634

2. 19.9% increase in hourly production.
3. Downtime per 8 hour shift cut one hour.
4. Old Method: 6 Hrs. productive time per shift @ 529=3174 pcs.
   New Method: 7 Hrs. productive time per shift @ 634=4438 pcs.
5. Production increase per man per shift = 39.8%.

ONLY THREE basic operations are performed when we take materials from storage to convert them into useful products. These are: (1) processing, (2) assembling, and (3) material handling.

Processing and assembly have been accepted by industry as being necessary. Their value has not been questioned. But material handling has been considered, by and large, a necessary evil.

At last, however, management is beginning to realize that material handling, in most industries, consumes more man hours than either of the other two —sometimes more than both combined.

Until recent months, there has been very little good engineering data which would help the planning of a sound material handling program into a plant design. A great many of the material handling systems installed in the last few years were started with the purchase of a piece of equipment—and without regard for the basic engineering principles upon which to base justification for its purchase. Equipment manufacturers and their sales representatives, as well as those who plan the plants that use equipment, know that we would have better, safer and lower-cost operations if the material handling systems had been designed in detail before plants were built or rearranged.

Increase Productivity and Profits

This Manual of Material Handling Procedure was conceived to provide the basic data needed to plan intelligently an economical system to fit a plant's needs. Our economist friends inform us that the next year or so will prove a critical period in the world's economy. There will be a "tightening in demand", and the companies which are able to "shave costs" will emerge victorious in the competitive race. If we improved nothing but our methods of handling material in industry, we could increase our productivity and our profits by large percentages.

In Section 1 (*FLOW, May,* 1954) process handling is described as "everything that happens in getting material to the right place, at the right time, between

(More on page 92)

Departmental Operations Analysis

Dept. _____ Date _____

Materials Involved	Yes	No	Explanation (Use back of sheet when required)
Are materials Gas?	☐	☐	
Liquid?	☐	☐	
Solid?	☐	☐	
Are they received in Cartons?	☐	☐	
in Bags?	☐	☐	
in Tote Boxes?	☐	☐	
on Skids?	☐	☐	
in Skid Boxes?	☐	☐	
on Pallets?	☐	☐	
Loose?	☐	☐	
Other (explanation)?	☐	☐	
Can receiving method be improved?	☐	☐	
(explain)			
Is material located convenient to operators and machines	☐	☐	
If not, why not? (explain)			
Does material location necessitate rehandling?	☐	☐	
How many pick-ups and lay-downs are required in the department?			
Do lines of material travel overlap or backtrack?	☐	☐	
How much time is expended in handling materials?			
Operations			
Are any materials handled by hand?	☐	☐	
Do males lift more than 50 pounds?	☐	☐	
Do females lift more than 25 pounds?	☐	☐	
Does any lifting require two or more employees?	☐	☐	
Have any accidents resulted from handling materials?	☐	☐	
Do skilled personnel waste time handling materials?	☐	☐	
Equipment			
List handling equipment in the department (In right hand col. estimate *a.* Age; *b.* condition)			
Is present equipment suitable for the job?	☐	☐	
If not, why not? (explain)			
Is equipment damaging materials?	☐	☐	
What equipment could you use?			
Miscellaneous			
Is there any damage to materials during moving or handling?	☐	☐	
Is storage space wasted because tiers are not to maximum height?	☐	☐	
Why do you believe this damage occurs?			
Are materials backed up at any point?	☐	☐	
Do production delays occur because of material jams?	☐	☐	
Are materials ever misplaced?	☐	☐	
Often?	☐	☐	
Why?			
Do any materials require special handling?	☐	☐	
(explain)			
Costs			
How many people handle materials full time?			
part time (explain)?			
What percentage of payroll goes for handling?			
What is cost of maintenance of handling equipment?			
What is annual value of material damaged in handling? (estimate)			
What is annual cost of lost-time accidents resulting from handling?			

Continued

and/or through the production centers within the contractor's plant."

That is entirely right, but what might be questioned somewhat is the last sentence in that Section, which reads: "But the big savings, the big possibilities that lie ahead, are in the transit phase and distribution phase."

In some industries and in many cases, this holds true. But, don't forget that "the time required and the distance traveled in the course of manufacturing a product directly affect its cost."

Whenever a material is picked up, moved, and set down, it increases the time in a manufacturing cycle and usually increases the distance.

It has been proved, time after time, that the longer the manufacturing cycle the higher the cost.

Consumer Concerns are Price, Quality, Utility

Customers are not interested in how many times a piece of material has been handled prior to the time it reaches them, nor are they inclined to pay premium prices because cost of production has been increased by ineffective methods of handling and production. The consumer is interested in price, quality, and usability of the product—and these generally suffer when a product is handled unnecessarily.

Let us examine the time factors involved in a work area of an operation that is familiar to most of us. (See previous illustration of punch press operation)

In review of the elements, it can be noted that: (1) the actual processing time (machine cycle) is .042; (2) the handling and positioning time equals .116 on the old method, and (3) through positioning of the material to the worker's level at the machine, the total handling time was reduced to .088 in the new method. The conclusions point out the total productivity gains made through a material handling improvement on just this one operation!

If we could only learn to regard material handling as a fundamental part of the productive process rather than as a method of transportation between processes, we would do a better job of engineering handling.

Handling Gains Greater

Let's briefly explore the economics of improving the punch press operation.

The machine cycle time of .042 was 26.5 percent of the actual time allowed the operator for punching the hole, while the other 73.5 percent of the time was spent in getting, positioning and removing the piece.

Now, assume that the machine cycle could be improved, through mechanical factors, and that we could better the operation on punching by 10 percent. We would gain 10 percent on punching the hole, but only an over-all gain of about 2.5 percent. Are we not much better off by gaining 10 percent or more on the material handling of the piece than on the machine cycle time?

The new method definitely shows an hourly production increase of 19.9 percent!

Anyone making his own survey will find that the percentages will vary with different operations, but these fundamentals will hold true in many types of manufacturing industries. Each year, many thousands of dollars and man-hours are spent on improving machines and tooling setups, when in a large majority of plants, the greatest source of potential gain is through improved material handling operations.

Continuous Flow Cuts Costs

Experience is a costly teacher, but, through the years, it has taught us that a continuous flow of material through operations is most effective. Regardless of job shop, intermittent, or assembly operations, your goal should be to apply the principle of continuous flow. Each time a material is stopped in its cycle, picked up and set down, you add to the cost of the product.

By now, you are thinking: "Some of this procedure looks good on paper, and some of that data I have read before, but what can be done with conditions around this plant?"

Some of our managements are resigned to accepting conditions as they are. Others have discussed doing something to alleviate various situations. But very little has actually yet been done. The first big job is not in the engineering of systems and equipment, but in bringing to organizations an awareness of the potential possibilities for savings through improved material handling methods and the installation of properly engineered equipment.

Recognition of material handling as a management function is relatively new, but it is related to and deserves mutual consideration with all other functions in planning and managing an industrial enterprise.

To get started with a long-range material handling program, why not take two or three parts or materials and follow them through each process? In doing this, make a simple flow chart on paper, listing the movements, pick-ups, set-downs, by what means, length of time and distance traveled, where it goes to and where it comes from. Another method is the "Departmental Operations Analysis."

By answering the questions on this; and using a flow chart, you should be able to come up with some convincing evidence that will show your management how a material handling improvement program will pay off.

Illustrations have been provided through the courtesy of The Union Metal Manufacturing Company.

The next installment of the Manual will include an explanation and full discussion of the Flow Process Chart and Flow Diagram applied in plant operations.

HIGH STACKING

Picture your product here...

Efficiency, that won TOWMOTOR leadership, can cut *your* material handling cost. Let a TOWMOTOR *Mass Handling Engineer* analyze your needs, without obligation.

TOWMOTOR
THE ONE-MAN-GANG

TOWMOTOR CORPORATION, Div. 810, 1226 E. 152nd St., Cleveland 10, Ohio

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Safe Scrap Handling

PROPERLY handled, scrap can turn headaches into profits. On the other hand, it can endanger personnel and damage equipment if allowed to accumulate. And, since individual metalworking plants have different scrap removal problems, it is necessary to devise a system whereby this non-productive handling is carried out with a minimum expenditure of time, effort and expense.

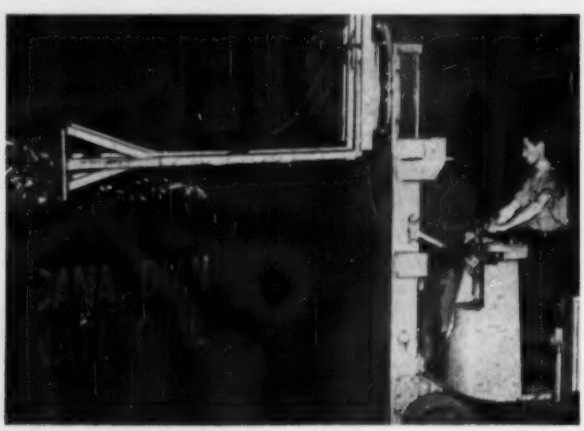
The Continental Can Company Limited in St. Laurent, Quebec, which supplies Canadian canners with some 2500 different specifications of metal containers, encounters the scrap problem peculiar to the can manufacturing industry. During production operations, a considerable amount of trimmings is generated, and manual handling is highly impractical.

Trimmings formerly were loaded into boxes which were subsequently loaded into rail cars by hand. Two men were required to tilt the scrap box to discharge the load, while a third man, working in the car itself, leveled the scrap. Not only was the man inside the car in constant physical contact with the sharp metal, but he faced the added danger of having the scrap box itself accidentally dropped into the car with him. And, as though the hazard weren't enough when this happened (and it did), there was the time lost in removing the box from the car.

Now, however, the entire operation is mechanized—affording complete safety and efficiency. Trimmings

(Continued on page 112)

SKID BOXES of scrap are picked up at production areas; dumped by revolving head truck.



LEVELING ATTACHMENT which fits over the truck's forks reaches into loaded boxcar and levels waste material.

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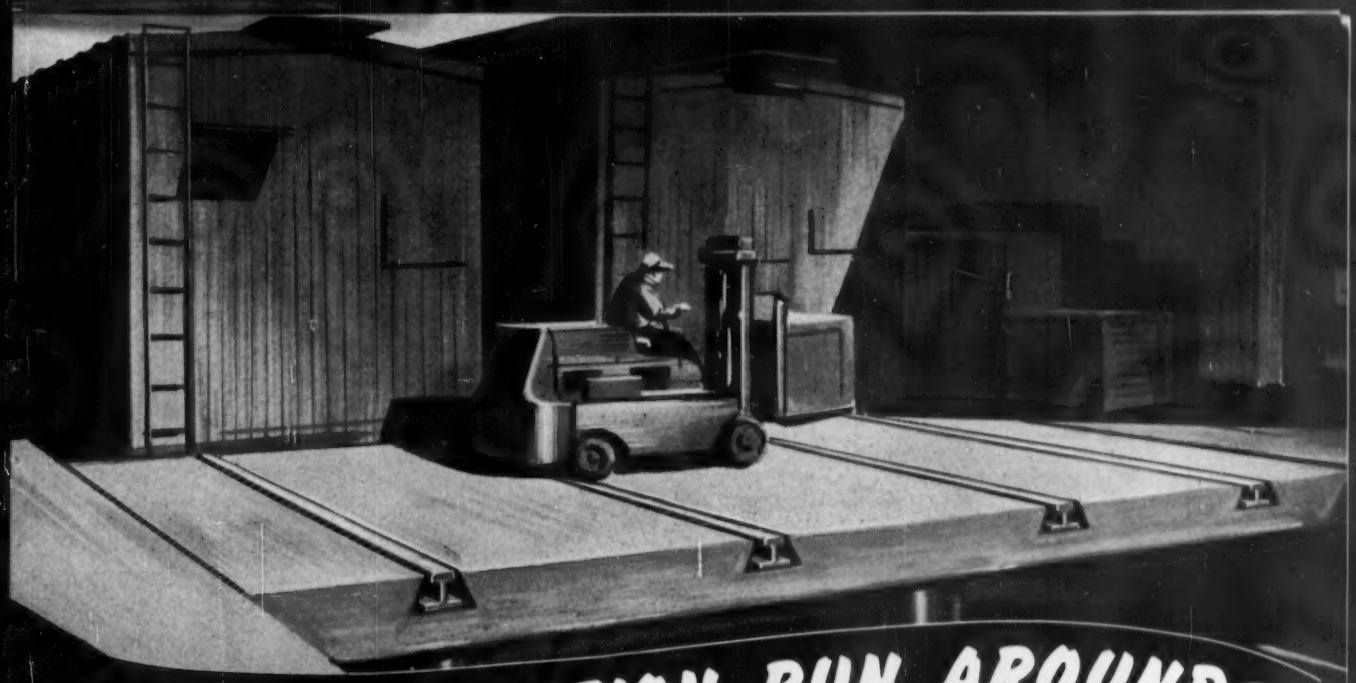
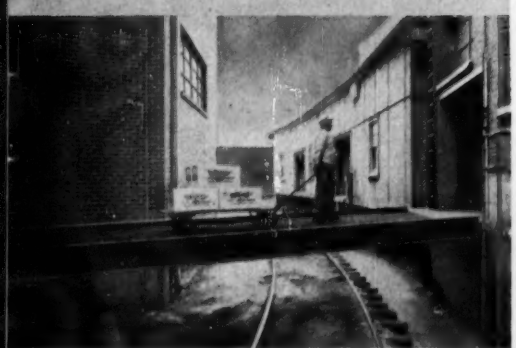


STOP PRODUCTION RUN AROUNDS

Bascule Double Type



Bascule Single Type

with WAYNE CROSS-OVER BRIDGES

Speed traffic in your plant! Cut out those costly, wasteful "run-around hauls" with Wayne Cross-Over Bridges. Miles and hours of unproductive travel can be turned into productive efficiency.

There's a Wayne Cross-Over Bridge to meet every location and need in your plant:

BASCULE TYPE—single and double, can be raised in a few seconds to clear road or railroad tracks.

PLATFORM TYPE—for single or multiple track installation to suit specific load requirements. Rails are recessed below floor line for smooth traveling. (See illustration top of advertisement)

Wayne Industrial Lifts are "precisioneered" in construction. Made to last for years without trouble . . . designed for easy servicing.

THE WAYNE PUMP COMPANY

SALISBURY, MARYLAND — TORONTO, CANADA

Write for new booklet on materials handling.

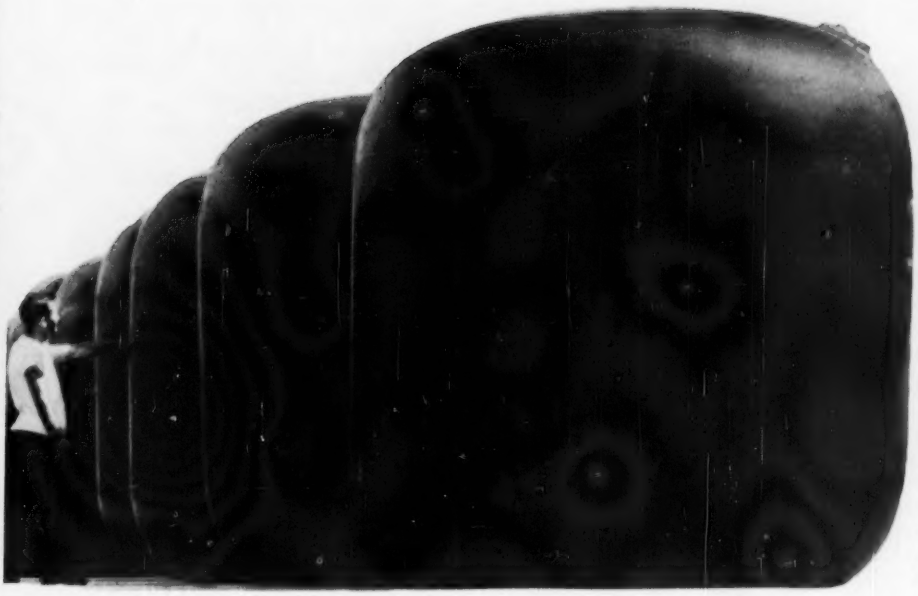
Wayne

NATION WIDE SERVICE

COMPRESSORS — HOSE REELS — LUBRICANT DISPENSERS — INDUSTRIAL PUMPS

has started a Revolution in Bulk Materials Handling, Shipping and Storing!

BULK SHIPPING of materials is now safe in uncovered trucks, cars or barges. You save on lower transportation and insurance rates. For return, SEALD-BINS fold to 1/10 size.



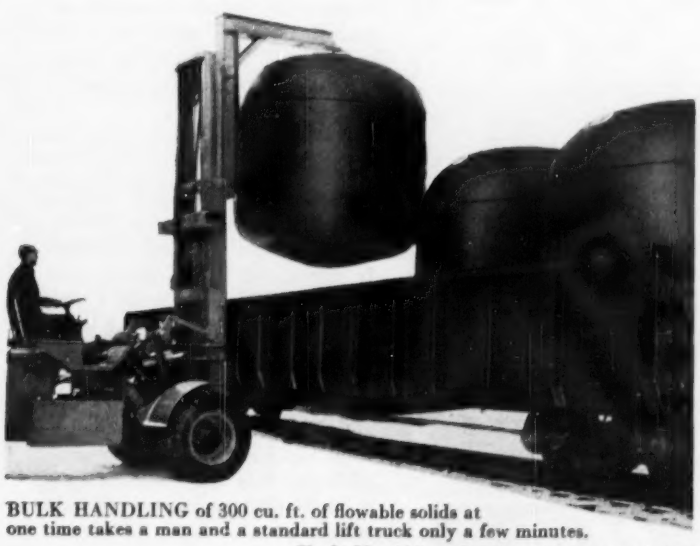
BULK STORING in U. S. SEALD-BINS requires no warehousing space, either before shipping or while awaiting use. Contents are safe in open storage.

Here is an entirely new concept of bulk handling, bulk shipping and bulk storing of flowable solid materials. For here is *low cost* combined with *complete protection* to the lading—from production to final use—all in the same bulk container!

We call this "closed" materials handling method the U. S. SEALD-BULK System. The unique and thoroughly patented collapsible container that makes it possible is the U. S. SEALD-BIN.

Built of synthetic rubber and fabric, similar to a tire, the U. S. SEALD-BIN is tough, non-corrosive, vermin-proof, moisture-proof and tamper-proof. It is engineered for handling by means of a top lift eye from which a patented internal cable assembly extends the load-carrying support to the bottom. Both the large 300 cu. ft. (4 to 12 tons capacity, depending on weight per cu. ft. of the lading) and the smaller 70 cu. ft. (1 to 5 tons capacity) SEALD-BINS are inflated after filling—either with air or, in the case of oxygen-sensitive lading, with an inert gas.

The U. S. SEALD-BULK System provides totally new opportunities to cut costs of packaging and shipping, reduce man-hours, and eliminate warehousing and loss of materials. For the complete savings story, write or phone for an illustrated descriptive booklet.



BULK HANDLING of 300 cu. ft. of flowable solids at one time takes a man and a standard lift truck only a few minutes.

US RUBBER

UNITED STATES RUBBER COMPANY

CONTAINER PRODUCTS DIVISION

Providence, R. I.

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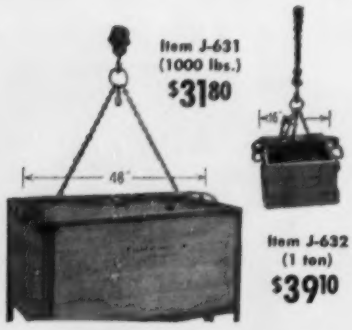
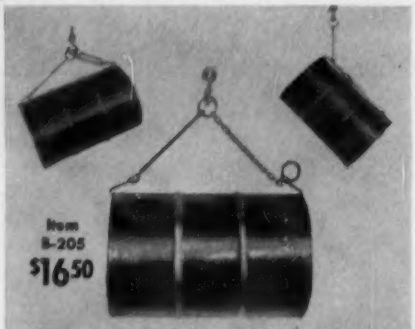
CONSULT P-S FOR THE BEST
Materials
HANDLING
EQUIPMENT
Custom Built To Meet Your Needs

We design and build all types of materials handling equipment . . . for pick-up, loading, moving, dumping or storage . . . made of metal, or wood, or combination.



UNIVERSAL GRAB
For picking up heavy boxes, crates, bales or other loads where hooks may be used. Heavy, forged steel hooks adjustable spread of from 16" to 48".

DRUM and BARREL TILT
A barrel tilt for controlled, precision dumping or pouring. Ideal for chemicals, solvents, powders, etc. Turns 360° through worm drive. Equipped with two safety type locking devices and all-steel, welded yoke. Hand-operated chain drive.

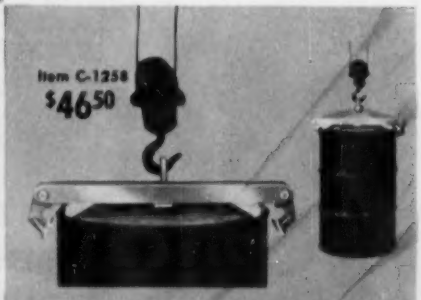


DRUM and BARREL SLING
Handles barrels, drums, kegs—anything with a lip. Half ton capacity. Heavy welded chain and forged grab hooks. Weight 8½ lbs.

BARREL CRADLE
Toggle Type
Picks up any shape barrel or drum, straight or bilged sides, flat or chimed ends—also without chimes (flush ends). Handles rolls of paper, carpeting. Heavy bar stock welded construction. Capacity 1000 lbs. Weight 45 lbs.

SHEET STEEL GRAB
Handles sheet steel bundles, any size 0" to 9" thick, 18" to 48" wide and any length.

BARREL and BOX GRAB
For picking up any type of wood or steel barrel, box or container, from 40" diameter down to small nail keg size. Will lift up to 2000 lbs.



Vertical DRUM LIFTER
For handling open and closed steel drums in vertical position, by crane or hoist. All-steel welded construction. Sure-hold safety barrel grip. Saves plant space. Use for either high or low ceiling condition.

When ordering Always give "Item" number; this will help prevent error. All prices are f.o.b. Detroit. Prices subject to change without notice.
Write for catalogue

DESIGNED AND MANUFACTURED BY
Palmer-Shile Co.
16012 FULLERTON AVE., DETROIT 27, MICH.

CASTERS . . .

(*Continued from page 79*)

Extra-Heavy-Duty. These casters are designed to perform under adverse conditions for long periods of time and are of precision type ball and/or roller unit type swivel bearing design having kingpin and swivel assembly construction permitting fine adjustment of and/or bearing replacement. These casters may be power-drawn up to 3 MPH.

Trailer-Duty. These casters are designed to perform under conditions normal to power-drawn applications up to 10 MPH and are of precision type ball and/or roller unit type swivel bearing design having kingpin and swivel assembly construction permitting fine adjustment. If main load swivel bearing is of commercial anti-friction design, the raceways are normally 7 inch diameter with ⅝ inch balls and are machined directly into the structural steel top mounting and horn plate members.

Industrial casters are generally heavier in frame construction than the others. To enable them to carry heavier loads over usually rough surfaces, these casters also are equipped with heavier wheels and have a wider tread in relation to wheel diameter. It is not unusual for an industrial caster to have a tread two inches wide on a wheel of as small as five inches in diameter.

Generally, industrial casters are made from heavy gauge steel and have a flat top mounting plate. Stem-type tops in the industrial field are not common.

Basic Types

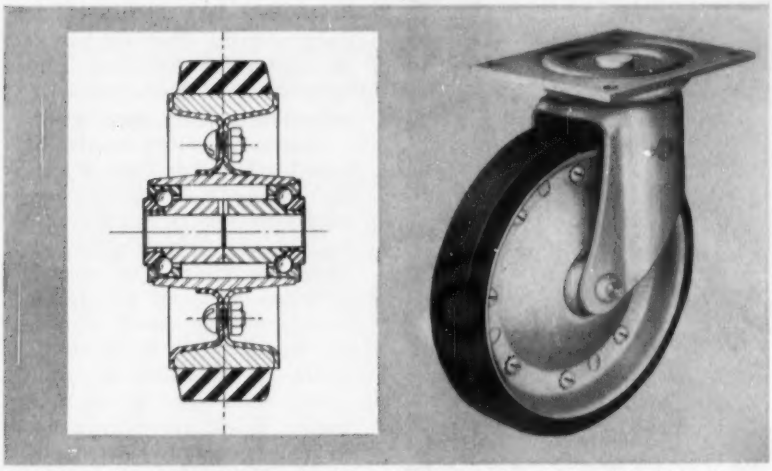
In all classifications of casters, there are two basic types—the rigid caster and the swivel caster. In swivel casters, the bottom part (horn assembly) can make a complete 360-degree rotation while the top section remains in a fixed mounted position. This type is also characterized by an axle that is not directly beneath but offset from the point of platform load-pressure. It is this positioning of the axle that causes the caster to swivel when a force is exerted

Circle No. 87 on Reader Service Card

MATERIALS-HANDLING NEWS

★ Panel Discussions by Bassick, World's Largest Manufacturer of Casters and Floor Protection Equipment ★

Improved rubber-tire caster handles high-shock loads



Unit design of bearings permits easy handling of bearing assembly when disassembling wheel. Bearings cannot be preloaded or misaligned in mounting wheel.

Rubber-tired disc wheels and double ball-bearing hubs feature new design innovations. Easy to disassemble; replaceable tire, disc and bearing assembly.

New design better eight ways

Bassick's medium-heavy-duty and medium-duty casters with demountable rubber tires feature *eight* improvements which make them top choice for heavy institutional applications.

1. **File-hard** (15N90 Rockwell hardness) bearing surfaces provide longer wear and service life, precluding premature failure.
2. **Permanently adjusted double-ball bearings** never require adjustment or realignment, unlike cone and cup design.
3. **Inner race construction** prevents pre-loading of bearings when axle nut is tightened, prevents misalignment during mounting of wheel.
4. **Unit bearings** can't fall apart when disassembling wheel.
5. **Completely replaceable** tires, discs and unit bearings.
6. **Electroplated** steel discs, bolts, lock washers, nuts have zinc or cadmium finish to resist corrosion — superior to paint.
7. **High-tensile rubber treads** vulcanized on hard non-stretching tread base.
8. **Alemite lubrication fittings** are standard, except on milk case dolly casters, which have flush-type lubricators.

You can order this new caster in Series 68, H68, and H99, swivel and matching rigid types, in 3½", 5" and 8" wheel diameters. For operational loads from 140 to 350 lbs. each. Full details in Catalog No. 4R-54. Facts on Sealed Swivel casters are yours in Catalog 3D99-53.

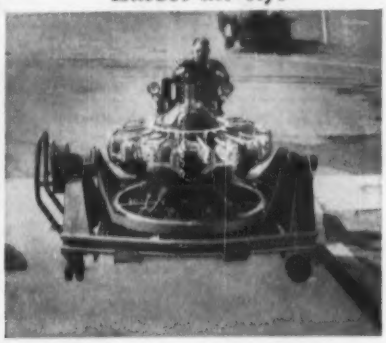
SERIES H99 swivel caster with demountable rubber tire, double-ball-bearing action for easy swiveling. 5" and 8" wheel diameters; loads, 250 and 350 lbs. each.

SERIES H68 swivel caster. Full case-hardened (15N90 Rockwell) bearing surfaces for extra wear (as in H99). 3½" and 5" wheel diameters; loads, 140 and 180 lbs. each.

So tough that file won't bite

You get extra service from Bassick steel casters case-hardened to 15N90 Rockwell hardness — even a file can't cut raceway surfaces.

Latest air lift



At AVCO's Lycoming Division, Stratford, Conn., they've come up with an unusual technique for handling the aircraft engines produced there.

Engines are assembled on a stand equipped with special dual-wheel Bassick casters designed for extreme heavy-duty service. Since these particular forged steel casters aren't built for road speeds, Lycoming engineers had to figure out a faster way of getting the stands from one plant area to another.

Wheels within wheels

You see their solution above. Fork-lift trucks snatch up the engine stand, casters and all, then whiz it off to the next station, where the casters take over low-speed movement. Result: No snail's pace progress between stations; no slow-down in production.

Ask the Bassick man

For the answer to *your* materials-handling problems, why not start with the man who handles the world's largest line of casters—your Bassick distributor. Whenever you want to move something, put it on Bassick casters — they deliver the goods. He'll be glad to show you how. Call your Bassick distributor.

THE BASSICK COMPANY
Bridgeport 2, Conn.
In Canada:
Belleville, Ont.

Bassick
A DIVISION OF
STEWART SW WARNER

MAKING MORE KINDS OF CASTERS MAKING CASTERS DO MORE

75 YEARS OF CASTER LEADERSHIP

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STUEBING DESIGNED • STUEBING ENGINEERED • STUEBING BUILT

HydroLectric LIFT TRUCKS

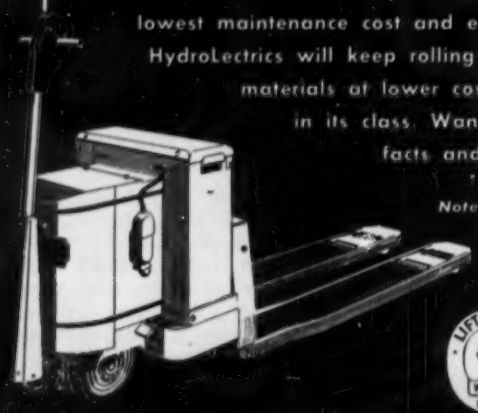
EXCLUSIVE

HEART OF THE HydroLectric

THE DYNA-DUAL POWER UNIT

This sturdy Dyna-Dual Power Unit out performs all others for ease of operation—dependability—lowest maintenance cost and economy of power. HydroLectrics will keep rolling and moving your materials at lower costs than any truck in its class. Want proof? Complete facts and data on request.

Note: The Dyna-Dual Power Unit is interchangeable on all models.



LIFT TRUCKS INC. W W W STUEBING CINCINNATI

LIFT TRUCKS INCORPORATED

2423-31 SPRING GROVE AVE. CINCINNATI 14, OHIO

There is a model for every purpose to handle any kind of material

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CASTERS

Continued

against the platform for a change of direction.

The distance between the vertical centerline of the kingpin (which is the center of the swivel orbit) and the axle of the caster wheel is known as the offset (lead). The greater the offset, the easier the caster will swivel. But, the greater the offset, the heavier the construction of the caster must be to withstand the increased leverage thus imposed upon it.

Some swivel casters are also designed with built-in shock absorbing systems to absorb impact shock forces, vibration and stresses induced by operating surface (floor) conditions. The principal advantages of casters with built-in shock absorbing systems are load, vehicle, and operating surface protection as well as increasing the ability of the wheel to climb obstacles. Shock abscribing casters must normally have suspension systems designed for specific applications since each system has its limitations concerning its effective operating range of action. Some shock absorbing casters are available with dual wheels, each operating with shock absorbing systems operating independently of the other wheel, while others operate dual wheels on one shock absorbing system.

The rigid caster is easily defined. Of course, it does not swivel. The legs and top mounting plate or stem are fastened in a fixed position, and there is no provision for swiveling action. In a rigid caster, wheel motion is only forward or backward. Rigid type casters are made by all caster manufacturers in sizes to match their swivel models.

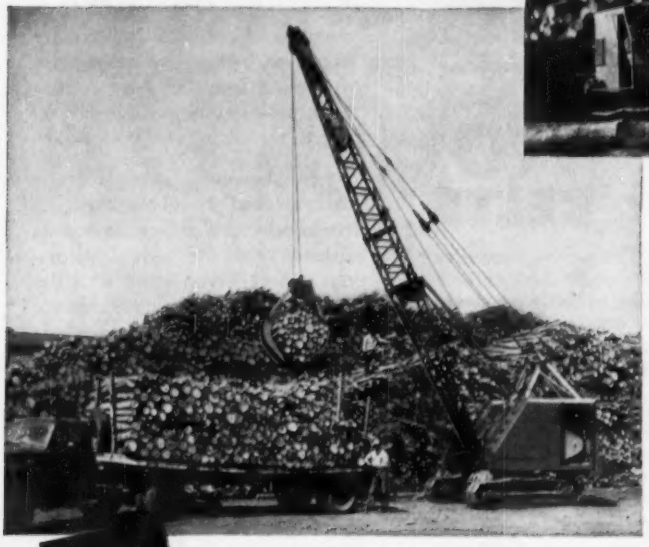
Caster Wheels

While a large number of wheel types are usable in casters, only about a dozen are generally regarded as standard.

Soft rubber wheels have a tread vulcanized on a hard composition core and are designed for use where casters must operate quietly and with minimum damage to floors and loads. They are also

what is your handling problem?

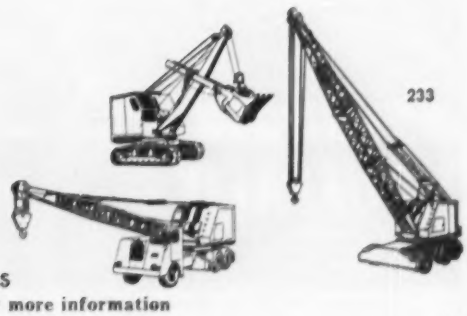
The yard handling problems of industry are many and varied. Here, for instance, a ¾ yard BAY CITY crane has solved a pulpwood and log handling problem. Hundreds of other yard handling problems are also being solved daily by BAY CITY cranes . . . and at low operating and maintenance costs, too!



The BAY CITY is a rugged, heavy-duty machine that is engineered for continuous high production and built for long life. It includes many outstanding features. Tandem drums give straight cable lead. Power booster clutches provide easy operation. Helical gears are quiet and smooth running. Long, wide crawlers provide a firm, solid foundation. Yes, no matter what your materials handling problem may be, it will pay you to ask your BAY CITY Dealer for complete details.

BAY CITY SHOVELS, INC. • BAY CITY, MICHIGAN

Write for these catalogs describing BAY CITY Crawlers of ½ yards and up or BAY CITY CraneMobiles and CraneWagons in capacities to 25 tons.



BAY CITY

SHOVELS • CRANES • HOES • DRAGLINES • CLAMSHELLS

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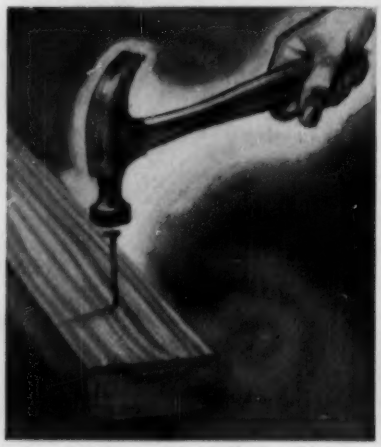
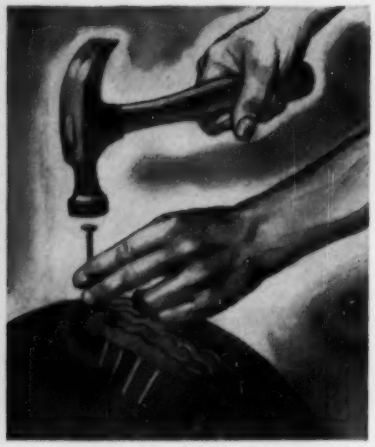
MAKE THIS SIMPLE TEST!



Start driving a ten-penny nail into a 2" x 4" and you'll find that the rigid resistance of the wood makes it a fairly simple job.



But . . . just try to drive a ten-penny nail into an unmounted tire. The "bounce" and lack of resistance will give you a good idea why Buffalo Belts with their "built-in bounce" wear longer than hard, rigid belts.

...and you'll always buy TOUGHER, LONGER LASTING

BUFFALO *Conveyor* BELTS

OVER
200 SIZES
35 WIDTHS
7 THICKNESSES

MADE OF SOLID WOVEN COTTON with our exclusive Wov-In-Wear process, Buffalo Belts are the conveyor belts with the "built-in bounce", like the tire in the demonstration above. Buffalo Belts are woven with that familiar "two-way stretch" to give them the resiliency to resist extra years of stress and strain on ANY conveying job. Because they are *woven*, Buffalo Belts offer little or no resistance to abrasive factors on your conveyor. Buffalo Belts adapt themselves to every curve and contour. In addition, these tightly woven, tough cotton belts can take the hardest kind of beating year in and year out without denting, raveling, tearing or cracking. It's the bounce in the cotton that counts! If you want longer lasting, *lower cost* belts . . . buy Buffalo!

IN ADDITION TO REGULAR WOVEN BELT, BUFFALO OFFERS 6 SPECIAL TREATMENTS TO HANDLE PARTICULAR PROBLEMS, FOR INSTANCE:

HOT GREASE

Buffalo's regular cotton belt is covered with a tough plastic overcoat to produce PLASTEX. This surface won't crack or peel and is impervious to hot grease, oils, acids, alkalies, moisture and temperatures from —20° to 200°F. Won't absorb or exude any odors and can be cleaned by ANY method including live steam.

FREE
14 PAGE GUIDE TO
Buying the Right Conveyor Belt for your Particular Job. Illustrated Uses, Maintenance Tips, Sizes, Prices.

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non-sparking and can be supplied in non-conductive rubber. Such wheels have a maximum load limit of about 700 pounds each.

Wheels with hard rubber on fiber composition cores are also designed to protect floors and are non-sparking. They have extremely high load capacities.

Pressed steel wheels are formed by continuous welding of formed discs together. These wheels resist heavy shocks and have a load capacity of 2000 pounds.

Steel and semi-steel wheels are forged or cast in various grades of steel or iron and have capacities up to 10,000 pounds, as required.

Semi-pneumatic wheels have hollow-center rubber tires or treads which also are known as cushion tires and have load ratings generally consistent with tire and rim association standards for wheels. They protect loads from moderate shock. This type of tire or tread does not require air pressure.

Wooden wheels are constructed of hardwood wedges held together by two round steel discs. They are non-sparking and easy rolling, and are protective to floors.

Aluminum alloy wheels are obtainable with steel or rubber treads. They reduce dead-weight of equipment. In rubber-tread models, they are sparkproof. They have one-ton capacity with steel treads.

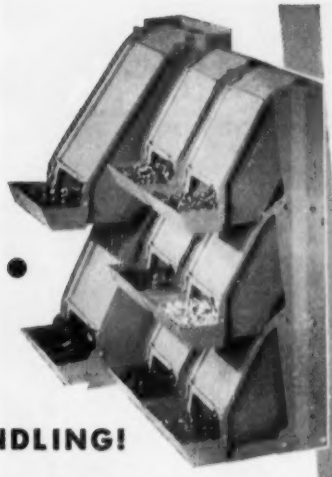
Canvas-tread wheels have end canvas assembled in blocks and set radially on the rim. They are shock-resistant, oil-resistant, and are noiseless.

Plastic wheels are molded from macerated solids (fibers, etc.), impregnated with phenolic resins; they are non-sparking, acid resistant, heat resistant, and roll easily.

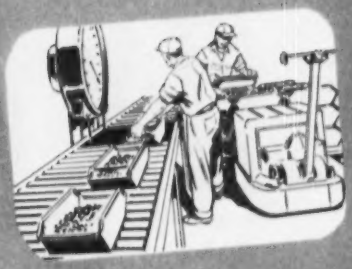
Solid rubber-tired steel wheels are available with molded-on or demountable treads. They protect floors, are noiseless, and generally have load ratings consistent with

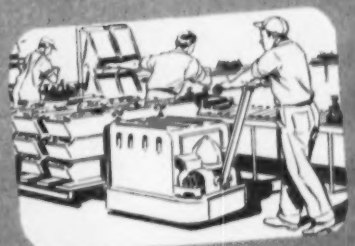
NESTIER® . . . *first again*

IN SMALL PARTS HANDLING!



NEW HOPPER RACK SPEEDS ASSEMBLY OPERATIONS





New economy and efficiency in assembly or production operations are assured by NesTier Hopper Racks. Designed to provide a constant supply of small parts, these new racks eliminate rehandling of parts at assembly points . . . provide fingertip accessibility . . . permit rapid replacement of empty units . . . simplify work station supply problems . . . reduce damage or loss inherent in frequent part transfers . . . facilitate more accurate inventory control.

Standard NesTier tote boxes are converted quickly into small parts hoppers by means of an easily attached combination lid and tray. Hoppers are supported at a 45° angle in housing racks that permit extreme flexibility of installation. Racks are bench or wall-mounted, and multiple combinations can be made by bolting units together vertically, side-by-side or back-to-back. Two sizes of all-welded heavy-gage steel Hopper Racks and lids are available to handle No. 120 and No. 175 NesTier boxes.

NesTiers can be filled at central point, batch weighed, delivered to assembly areas by hand or power lift truck and stacked at work stations as reserve supply ready for immediate use. Empty hoppers can be dismounted and replaced with full units in seconds. In addition, minimum floor space is required for temporary storage of empty NesTier boxes because of their nesting design.

THE CHAS. WM. DOEPKE MFG. CO., INC.
8836 BLUE ASH ROAD • ROSSMOYNE, OHIO

FOR COMPLETE DETAILS, WRITE TODAY FOR NEW BULLETIN HR-101

C-187-DN

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COLES..the Only Crane with

● **FULL RATED CAPACITY OVER THE SIDE.** Safe-load indicator protects against overload.

● **SHORT TAIL SWING** Giving Maximum Effectiveness in Restricted Areas.

● **ONE YEAR WARRANTY** — Coles is the only Crane providing a full year warranty.

● **CANTILEVER BOOM** which Enables You To Work Effectively Over Gondola Cars and Stock Piles and Gives Greater Reachability.

● **REVERSIBLE STEERING** Providing Instinctive Steering Control Even With Boom Over Side.

● **SAFETY LIMIT SWITCHES**—Positively protects the hoist and Boom Hoist Mechanism should the driver attempt to operate beyond the prescribed limits.

There are many more exclusive features, each one designed with material handling in mind. Investigation will show you how all these features combine to provide you with truly effective lifting in the most economical manner.

Write for further details

Coles Cranes, Inc. Box 942 —Joliet, Ill.

COLES CRANES — THE NAME THAT CARRIES WEIGHT IN MATERIAL HANDLING!

STEEL

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CASTERS

Continued

Tire & Rim Association standards for wheels.

Solid rubber-tired wheels are inserted between two heavy gauge steel discs which are bolted together to form the wheels. Capacities will vary, depending on quality.

Pressed steel discs may be periphery welded with molded-on rubber tires; again capacities will vary, depending on quality.

Pneumatic wheels consisting of a formed steel rim and hub assembly mounted with a separate tire and tube, require air pressure which can be adjusted to suit the loads. They are highly desirable when handling fragile goods, or for operation over soft terrain.

Running-Gear Arrangements

Casters may be positioned in several standard arrangements. These may be grouped into two main classes according to whether they cause or prevent a tilting of the platform by an up-down motion at either end.

With a tilting arrangement, two casters are positioned midway between the two ends, and are of larger size than other casters located at the opposite ends (or the center units may have longer connectors between themselves and the platform). In this way, the platform balances on the center units, which are always non-swiveling.

Total casters in the tilting arrangement may be four or six, either in a 1-2-1 or a 2-2-2 order. The end wheels may or may not be of the swiveling type.

With swiveling ends, the truck can be maneuvered while either end is resting on the floor. With non-swiveling ends, the truck must be momentarily balanced on its center wheels for steering or maneuvering.

The tilt-type arrangement also includes semi-live skids which have two wheels or two non-swivel casters at one end, and rigid legs at the other.

With a non-tilting arrangement, fixed-position casters may be used at one end while swiveling casters

B.F.Goodrich

TW ANALYSIS helps forge plant increase industrial tire service over 500%

This truck is hauling a 5-ton die-holder in a large Cleveland forge plant. B. F. Goodrich oil-resisting tires on front wheels have delivered over 2688 hours of hard service where ordinary tires fell apart after only 500 hours.

THE maintenance men of a large Cleveland forge plant had a real problem on their hands. Industrial tires in heavy-duty service were "falling apart" under heavy loads after only 500 hours.

The local B. F. Goodrich man made a Tire and Wheel Analysis. As a result of his findings, new Deluxe Cushion Pressed-On tires with an oil-resisting compound were placed on a truck in regular service. Most of the trucks in this type of service have since been equipped with B. F. Goodrich oil-resisting-compound tires. Service hours have been increased more than 500%.

Pressed-On Deluxe Cushion tires are available with non-directional traction tread and in some sizes with smooth tread . . . and are made in a variety of compounds to meet any type of service condition. A special process that bonds the tread to the steel base assures positive adhesion of tread for life of the tire.

TW ANALYSIS CAN SAVE YOU MONEY

Just contact your local B. F. Goodrich retailer or mail the coupon below. Without cost or obligation, a trained B. F. Goodrich man will study your materials handling operations and make recommendations that can cut your industrial tire costs . . . reduce maintenance expense. The advice you receive will be unbiased, for B. F. Goodrich makes a *complete* line of industrial tires for every type of service. A special TW Analysis is available for manufacturers of industrial equipment.

Here's a close-up of the front tire on the truck pictured above. 2688 hours of service and still rolling!

This B. F. Goodrich Deluxe Cushion tire has been in service for 770 hours. Tread shows little wear.

Specify B.F. Goodrich tires when ordering new equipment

The B. F. Goodrich Company
Tire & Equipment Division
Department TW-417
Akron 18, Ohio

Please send me:

- ☐ Additional information on your Tire and Wheel Analysis Plan
- ☐ Free copy of "Industrial Tire Guidebook"
- ☐ Free copy of "How to Get Extra Service out of Solid Industrial Tires"

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CRANEMASTER

- Standardized models fit virtually every building condition—save you special engineering costs.
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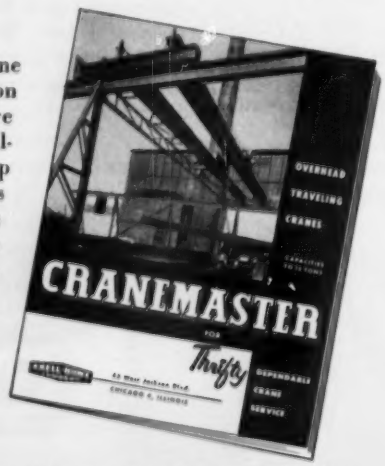
If you are looking for real crane value, get complete details on CRANEMASTERS . . . compare value-for-value, dollar-for-dollar with any other units up to 15 tons capacity, with spans to 60 feet. The new Bulletin illustrated here will help show you why you get the most for your crane dollar with CRANEMASTER. Write for your free copy now.



Ask for Bulletin C-120

ABELL-HOWE COMPANY

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Chicago 4, Illinois

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CASTERS

Continued

are used at the opposite extremity. The use of four swivel casters—two at each end—is equally common. Occasionally a three-wheel, all-swivel, tripod type is also used.

Making A Selection

In selecting the best style and combination of casters, consideration should begin with the load to be carried, operating surface conditions, speeds of operation (manual or powered), and the platform to be used.

Total weight of load and platform will determine the strength to be required in the casters. The load factor should also include allowance for any shock to be sustained in placing the load, or to be encountered in movement over the floors.

Whether the load can be safely tilted may be a second consideration. Liquids and glassware, for example, might require a non-tilt arrangement.

Distance the load is to be hauled and the question of steering and maneuverability will also be factors in choosing between a tilting and non-tilting arrangement. For long distance movement, steering is easier with the non-tilting type. For simple adjustments of position, and for sharp turns in narrow aisles, a tilting model may have advantages.

Distribution of load pressure is another important factor in some cases. If the load is heavy at the corners of the steering end, for example, a swivel caster at each corner of this end may be needed. Distribution of load pressure may also indicate whether a caster arrangement should be in a 2-2, or 1-2-1, or 2-2-2 pattern.

Load considerations also will influence the choice of casters and their arrangement. The width of wheel treads also should be correlated to the load—the heavier the load, the wider the tread, and the greater the diameter.

The condition of floors on which the trucks are to be moved should be a major consideration in selecting size of casters of wheels. Rough floors and steep inclines favor large wheels. Soft

New Materials-Handling Technique Features Tractor Shovel with Quick-Change Front End

Equipment flexibility is an important answer to high production costs. This accounts for the popularity of the thousands of Allis-Chalmers HD-5G Tractor Shovels now in use in plants of all kinds. The 40-hp. crawler, with its wide range of front-end attachments, digs, carries, dumps, stockpiles, spreads or loads materials of all kinds. Its power and versatility enable it to replace a fleet of part-time specialists . . . to pay its way *full time* both in and around the plant.

DIGS TRENCHES With Trench Hoe attachment, the HD-5G digs a flat-bottom ditch 27 in. wide and to a depth of 8 ft. Ideal for laying pipe, digging foundation footings, other vertical excavations.

SKIDS, LOADS, STACKS SOLIDS Lift Fork attachment handles steel beams, pipe, lumber, packaged or palletized loads up to 4,000 lb. Works easily in unpaved yards where rubber-tired equipment bogs down.

OTHER attachments include Narrow Bucket, Rock Bucket, Rock Fork, Tine Fork, Crane Hook and Drag Bucket. Attachments may be interchanged in about 20 minutes by simply removing and replacing four pins. Ask your Allis-Chalmers dealer to show you how the versatile HD-5G can increase efficiency in and around your plant.

HANDLES SAND, CLAY — ANY BULK With standard 1-yd. bucket, the HD-5G loads trucks, feeds hoppers and conveyors, builds stockpiles. Crawler tracks stand up in cullet and other abrasive material as only steel can.

SPEEDS YARD MAINTENANCE AND NEW CONSTRUCTION Bulldozer or Angledozer blades quickly clear or level land for new construction, backfill trenches and foundations, maintain unpaved yard roads.

CLEARS SNOW Big 2-yd. Light Materials Bucket quickly cleans up and loads snow from yard roads and parking lots. Also doubles output in coal, coke, cinders and other light materials.

ALLIS-CHALMERS
TRACTOR DIVISION • MILWAUKEE 1, U. S. A.

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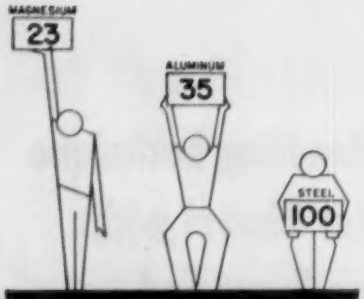

Cut the Power Costs

BY SHARP REDUCTIONS IN

DEAD WEIGHT

Where weight reduction means cost reduction in terms of power or of human effort—USE MAGNESIUM.

Magnesium is the lightest of all commercial metals. Aluminum is 50% heavier. Weight-reducing conversions from heavier metals to Magnesium are popular—and profitable.

Magnesium handles well. It is easily riveted, welded, sawed, drilled.

B&P's practical suggestions are yours for the asking, without obligation. Write or phone B&P's Sales Engineering Department about how you might use Magnesium plate and sheet —also tread plate.

This new folder gives facts-and-figures . . . and suggests weight-saving applications. Write us to mail you one.

LIGHTNESS B&P ...PLUS

BROOKS and PERKINS Inc.

Pioneer Magnesium Fabricators

Rolled Magnesium Plate & Sheet
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CASTERS

Continued

floors call for wide cushion treads of wheels. The same is true when floors are made of materials that are easily damaged.

If loads must be protected from shocks, rough floors may also indicate a need for casters employing shock absorbing systems or cushion tread wheels. A need to escape excessive noise may also influence the decision in favor of certain wheel types and materials. On the other hand, operations in areas where there is excessive grease, metal chips, or other substances damaging to rubber or composition materials, may compel the use of steel or other types of wheels.

Points of change in floor slopes, or humps created where plates or bridges extend between motor truck floors and loading platforms also should be a major consideration in choosing casters and their arrangement.

With a truck without center casters, the sharper the hump the greater will be the amount of under-clearance needed. This may be provided by larger wheels, or by providing higher connecting brackets between wheel and platform. Ordinarily, larger wheels are the better solution.

With center-wheel equipment, underclearance is less often a serious factor because the effective wheelbase consists of only half the distance between the two ends. However, when trucks with center wheels are moved over a hump, the total tilt is greater than that of a truck that has casters only at its two ends.

Width of aisles in relation to width of truck platform should also influence a choice. If side-clearance is small, a truck that steers at only one end will be less likely to bump at the sides. However, a truck with center wheels or one that swivels at all four corners can make shorter turns at an intersection.

Last among the major mechanical factors to consider is the amount of speed required. Here the basic rule is that the greater the speed, the larger and more rugged the caster. Also, the higher

TO PEOPLE WHOSE PUSHERS ARE PUSHING BIG HEAVY CLUNKERS:

The more dead weight they push . . . the less of your merchandise gets moved!

You'll get more, faster, safer pushing from your pushers the day you replace "snail's-pace" steel and wood pushcarts with B&P's light, modern

MINIMAX **Pusharounds**

Made of the lightest weight structural metal

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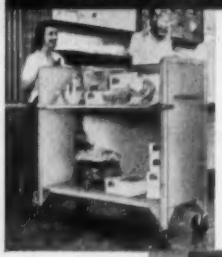

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Merchandise Marking Truck

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Write or phone B&P today about saving your Pushmoney with Pusharounds. Tell us about your uses. We'll adapt our flexible Standard Models to your needs . . . or build what you want . . . PUSH-AROUNDS PAY THEIR WAY . . . PRONTO!

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MICHIGAN *bucket control means "Bigger Loads . . . . . FASTER"*

Watch a MICHIGAN Tractor Shovel at work —with particular attention to bucket action —and you'll *see* how a MICHIGAN* will *handle bigger loads, move more yardage*—faster, at considerably lower cost.

- *Tremendous break-out power*—ram the cutting edge into any tough, hard-to-dig clay, shale or loose rock—and *work the bucket* to loosen it
- *Bucket roll-back at ground level*—pick up and transport full buckets at low center of gravity for safe traveling, no void space in the bucket; more work in less time
- *Remarkable digging ability*—two large double acting cylinders on bucket and two large double acting cylinders on main lift give excellent control and superior digging action.
- *Good bucket height and reach*—high dumping clearance and ample forward reach make trucks easy to load.

Check these outstanding Quality Features of MICHIGAN* Tractor Shovels

1. **Superior Bucket Action**—bigger loads, faster loading
2. **Clark Power-Shift Transmission**—faster operating cycle gets more yardage
3. **Clark Torque Converter**—3-to-1 torque multiplication; power when needed—no conventional clutch
4. **Clark Planetary Axle**—relieves torque load on shafts and gears, prolongs machine life
5. **Power Steering**—much easier handling, lessens driver fatigue
6. **Gas or Diesel**—right power for the job; more horsepower than any comparable machine

Six models: capacities from 1.5 cubic feet to 2¼ cubic yards. Facts about the MICHIGAN Tractor Shovel are important—and interesting. The MICHIGAN Fact Folio contains specifications and action photos. The coupon gets it for you.

*A Trademark of Clark Equipment Company

CLARK EQUIPMENT

16A

CLARK EQUIPMENT COMPANY
Construction Machinery Division
440 Second Street, Benton Harbor, Michigan

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New . . . Different . . . Better

COFFING

Super Power

COIL CHAIN

RATCHET LEVER HOIST

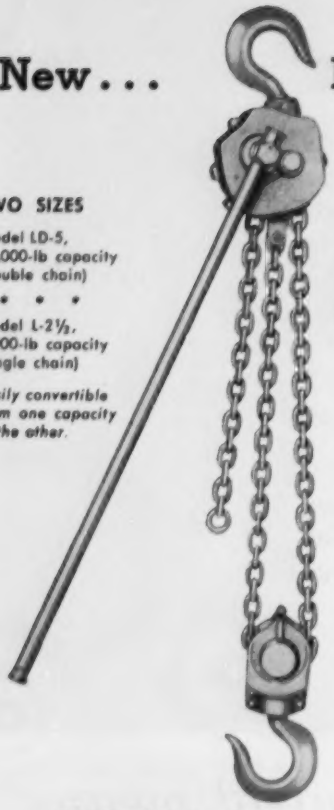
TWO SIZES

Model LD-5, 10,000-lb capacity (double chain)

• • •

Model L-2½, 5,000-lb capacity (single chain)

Easily convertible from one capacity to the other.



For over two years the entire production of Coffing's new Super Power Ratchet Lever Hoist has gone into military service. Now it is available to bring new standards of ratchet hoist performance to civilian users. These are just a few of the advantages this new hoist offers:

SIMPLE in design

Parts are simple, rugged and few in number to assure continued top performance. May be disassembled in the field for fast, efficient servicing.

The only 5-ton hoist of this type using but two chains, contributing to faster operation and lighter weight.

CONVENIENT to use

Handle adjustable for close-quarter applications — also may be operated from opposite side of hoist.

The 5-ton model weighs but 58 lb — lightest weight ratchet hoist in this capacity on the market.

Only 70 lb of handle pull needed to lift 10,000 lb with patented compound lever principle.

You get coil chain flexibility plus free chaining for quick adjustment.

TOUGH for safety and dependability

Ratchets and pawls are specially hardened alloy steel — *every* load-holding ratchet is tested at 30,000 lb.

Housing is certified malleable iron to protect hoist from rust and damage.

Handle is designed to bend before hoist is overloaded beyond safe limits.

For full details, write for Bulletin FL10L.

IN PUNISHING "DROP TEST," the Super Power had to withstand the shock of a 10,000-lb load dropped 4 in.— *an impact load of over* 40,000 *lb.* After several hundred such tests of Super Powers, there has never been a hoist failure!

COFFING HOIST COMPANY • DANVILLE, ILLINOIS

Originators of the Ratchet Lever Hoist

QUIK-LIFT ELECTRIC HOISTS • HOIST-ALLS • MIGHTY-MIDGET PULLERS • SPUR-GEAR HOISTS • DIFFERENTIAL CHAIN HOISTS • LOAD BINDERS • I-BEAM TROLLEYS

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the speed, the greater the importance of choosing a steering arrangement that can be handled with maximum ease, accuracy, and safety.

Applications

It was stated at the outset of this report that casters are designed for use on both purchased handling equipment and company-engineered carriers.

Of special interest, and an often overlooked factor, is that casters may be installed on stationary equipment found in plants to provide desired mobility.

For example, one large manufacturer of public transportation vehicles begins assembly operations with a giant frame housing mounted on a series of grooved wheel casters that ride on inverted V-shaped tracks. The assembly proceeds as the vehicles are built up on the frames, which are indexed from station to station. Eventually, when the vehicles are nearing completion, they are lifted off the frames and lowered onto their own wheel assemblies.

Many smaller assemblies are worked on while mounted on castered frame supports which may thus be moved about as required.

Another application for casters is found at the plant of a prominent Wisconsin leather processor who places tanned hides on standard wooden horses which are castered for maximum mobility.

A-frames, designed to hold in-process parts, are often castered for ease of handling. Standard shop boxes are likewise castered for ease of movement between machines, as are standard racks and rack supports.

Small machine tools are often "mobilized" where it is prudent to move the machines to the work rather than the work to the machines. Special carriers may be fabricated to move oxygen cylinders between welding operations—with casters providing the flexibility required.

In conclusion, it may be safely stated that castered equipment has definite application where (1) ex-

Manual to Mechanized

Saves $50,000 a Year

By mechanizing its material handling system, Rosenberg Bros. and Co., Santa Clara, Cal., has speeded and simplified dried fruit handling, achieved fuller use of its in-plant air-rights, and improved plant housekeeping.

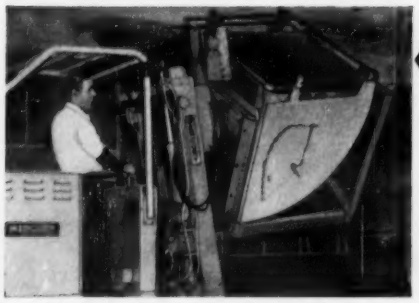
The new handling system is built around portable open top storage bins and Mercury electric fork trucks equipped with special roto-lift attachments.

This completely mechanized handling system results in a minimum annual savings of over $50,000.

The 180° right or left rotation of the roto-lift carriage attached to the Mercury "Yak," allows the truck operator to lift a loaded bin over the hoppers, center it exactly over a hopper partition, and dump it into the processing channel.

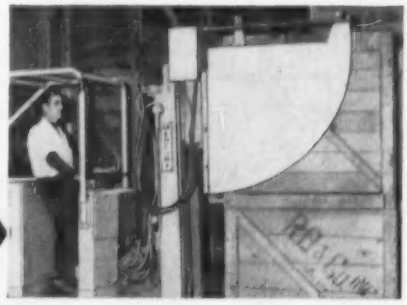
Find out how MERCURY can effect important savings for your company. Write or wire today!

Mercury Fork Trucks with special Roto-Lift attachments speed and simplify handling



Mercury "YAK" fork truck with roto-lift attachment empties load into hoppers. These special attachments permit the use of 4' x 4' x 4' open-top wooden bins, eliminating use of bulky fabric bags and manual handling operations.

Here the operator picks up a bin before transporting it to processing area. Formerly, products were shoveled into wheelbarrels, wheeled to processing area and dumped into hopper. In addition to eliminating manual handling operation, plant housekeeping is considerably improved.



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Name Brand Products

ride smoothly on

ALVEY engineered conveyors

The well-known trademarks above belong to a few of the many important textile producers who place their confidence in Alvey Engineered Conveyors.

These mills know how cartons, rolls, bales, folded goods, doff boxes, bobbins and many other textile units are successfully conveyed by Alvey equipment.

Your letter will bring an Alvey engineer to discuss your conveyor problems with you.

Every time you MANhandle a package, you add to the cost and nothing to the value; therefore, put your packages on Alvey Conveyors that are engineered to fit your individual requirements.

ALVEY

ALVEY CONVEYOR MANUFACTURING COMPANY

9299 Olive Street Road, St. Louis 24, Missouri

Branch Offices in Principal Cities

Circle No. 166 on Reader Service Card for more information

CASTERS

Continued

cessive crowded and congested conditions exist—around machine areas, for example; (2) where floor conditions will not permit heavier, powered rolling equipment; (3) where moves are short, and loads are not excessive; (4) where loading and unloading of rail cars and highway carriers is complicated by limited floor capacities; (5) where minimum turning requirements are necessary; (6) where mobility is required of fixed equipment; (7) where non-powered equipment may be coupled and pulled by a powered truck for maximum volume at minimum cost.

SCRAP HANDLING . . .

(*Continued from page* 94)

are loaded into specially-designed skid boxes which are picked up at the production areas by fork trucks and moved to the rail docks where gondola cars are spotted.

Channel irons are welded across the bottoms of the boxes to permit dumping without removing the boxes from the truck's forks. A revolving head on the fork truck inverts the boxes, discharging the scrap directly into the rail cars. To complete the operation, a simple attachment which fits over the forks of the truck levels the trimmings in the car.

This attachment eliminates the dangerous job formerly performed by the man inside the car. Furthermore, at no time during dumping or leveling is an operator required to risk contact with the sharp metal. Added to all this—the entire job is accomplished in a fraction of the time formerly required.

The same handling technique has been applied to the company's black plate trim, which is baled, with comparable time savings. Once loaded by hand, the 70- to 80-pound bales are now placed on pallets, moved by fork trucks, and dumped into cars in the same manner as the loose scrap.

Equipped with a V-type snow plow, this MM Model RTI Wheeler gets easily into cramped quarters . . . does a fast job of clearing narrow driveways or traffic lanes.

With this fluid-driven sweeper mounted on the RTI, you sweep traffic lanes, parking lots, and storage yards fast and clean. You get rid of the snow before it has a chance to melt and form troublesome ice.

Wheeled Hydraulic "Packages" Move Snow at Low Equipment Cost

Snow removal is a non-productive *must* that taxes any budget. That's why faster, more efficient snow handling systems are constantly being sought. MM Wheelers have proved a low-cost answer to snow removal problems because they mount a wide choice of snow handling equipment on the same basic materials-handling machine used the year around.

For big capacity loading, the heavy regular material bucket can be replaced with a lighter and extremely large snow bucket. For plowing, either V-type of rotary plows can be mounted. For other jobs, fluid drive sweepers are the most economical and efficient equipment.

High road speeds enable Wheelers to cover ground fast. Short turning radius and hydraulic control of snow handling attachments permit fast, easy operation in close quarters. When windrowed snow must be loaded without blocking traffic lanes, recently-developed side-dump buckets are an effective solution. All-weather cabs are available to permit operation under any weather conditions.

While snow handling is an off-season job, it will pay to consider Wheeler advantages for other materials-handling jobs, too. Write for complete information on the 30-horsepower Model RTI and the 57-horsepower Model UTIL with shuttle gears for 6 forward and 6 reverse speeds. UTIL features now available include the new turbo-cell diesel engine and hydraulic power-flow steering.

MINNEAPOLIS-MOLINE
MINNEAPOLIS 1, MINNESOTA

Deep, hard-packed snow drifts are no problem for this rotary plow and blower, mounted on the RTI. Powerful blower distributes snow well away from plowed area . . . eliminates banking.

Circle No. 113 on Reader Service Card for more information

in useful literature

These publications, written by experts, are available. Indicate your choice on the self-mailing Readers Service Card.

Tote Pan News:

A new, lightweight, leakproof, drawn tote pan designed to fit the needs of production shops of all types, is described by Bathey Manufacturing Company in a colorful release.

Circle 236 on Reader Service Card

Combination Truck-Ladder:

The high deck truck and the high reach ladder have been combined by Rol-Away Truck Manufacturing Company to give a truck for added efficiency with extra high stock shelves. The unit is detailed in brochure form.

Circle 237 on Reader Service Card

No More Tangled Cords:

The continuous swiveling Appleton Reelite, product of Appleton Electric Company, is said to increase cord life, reduce accidents and put the light where you want it. Too, it eliminates the tangled cord problem.

Circle 238 on Reader Service Card

Hydrocrane Pamphlet:

A handy pocket-size pamphlet entitled "those who use it . . . choose it again!" describes Bucyrus-Erie's truck-mounted, all-hydraulic Hydrocrane from the repeat order angle.

Circle 239 on Reader Service Card

Industrial Wear Control:

American Brake Shoe Company has published its first complete catalog, with emphasis on industrial products. The catalog contains sections on ferrous and nonferrous castings, welded products, air compressors, industrial pumps and railroad products, among other items.

Circle 240 on Reader Service Card

Vulcanized Fibre Equipment:

An informative folder on hard vulcanized fibre material handling equipment is offered by William Bal Corporation. Entitled "Craftsmanship", the brochure describes representative types of equipment used in various operations.

Circle 241 on Reader Service Card

Highly Adaptable Dockboard:

Magnesium Products of Milwaukee is featuring its Series T dockboards in a new release. It is designed specifically for wheeled equipment where underclearance is not a problem.

Circle 242 on Reader Service Card

About Chains and Sprockets:

Stock Roller Chains and Sprockets is the title of a 64-page illustrated book published for distribution by Diamond Chain Company, Inc. It covers a complete line of roller chain stock sprockets.

Circle 243 on Reader Service Card

Engine Hour Meters:

The latest edition of "Meter Talks" published by John W. Hobbs Corporation answers questions about the firm's engine hour meters—tells what they can and will do for your business.

Circle 244 on Reader Service Card

Permanent Truck Records:

A fourth edition of the booklet, "10 Ways to Get More Work From Your Trucks" has been released by the Service Recorder Company. Revised to include latest designs of Servis Recorders and charts, the booklet explains how this precise instrument makes permanent records of when and how long motor trucks and industrial trucks stand still, when and how long they are busy each day.

Circle 245 on Reader Service Card

Profits You Can See:

Brown-Line Corporation has published a brochure describing two features of interest to the trucking industry—use of the Brown-Line "Damage Control System" and "Second Deck", claimed to increase loads by as much as 2 percent.

Circle 246 on Reader Service Card

Versatile Structural Member:

Facts about the Versabar, product of M-H Standard Company, are detailed in a four page release. This structural member may be used for construction, lighting, piping or racks.

Circle 247 on Reader Service Card

Handy Portable Elevators:

A catalog from Economy Engineering Company features the new Economy Worklifters, portable, battery-operated, hydraulic lifters, available in a variety of special purpose designs, with 1000 pounds capacity and lifts to as high as 80 inches.

Circle 248 on Reader Service Card

Storage Problem?

A colorful new 4-page folder is available from Stackbin Corporation which describes the Stackbin System of storage and material handling. It shows graphically how the system is used to cut handling costs, save space, improve inventory control and minimize loss and damage.

Circle 249 on Reader Service Card

Transmission Line Kit:

New literature describing RCA microwave transmission line and accessories is available from the Engineering Products Division, Radio Corporation of America.

Circle 250 on Reader Service Card

Wheel Study:

"Rolling Resistance" is the title of a new, comprehensive technical study prepared by The Hamilton Caster & Mfg. Co. for release to industrial wheel users. The report is based on tests of 39 combinations of wheels, tires, axles and bearings.

Circle 251 on Reader Service Card

Strapping Pallet Loads:

A recent issue of "Signode Seal", published by Signode Steel Strapping Company, gives valuable packaging and carloading ideas, as well as information on how to strap pallet loads.

Circle 252 on Reader Service Card

Engineered Taping:

How colored and transparent "Scotch" brand acetate fibre and film tapes have been engineered for varied industrial taping applications is shown in a new 6-page folder available from Minnesota Mining and Manufacturing Company.

Circle 253 on Reader Service Card

Appliance Handling:

The American Pulley Company has available a new catalog on its complete line of appliance handling equipment.

Circle 254 on Reader Service Card

This battery just fell off the shipping dock!

The EDISON Nickel-Iron-Alkaline Storage Battery, shown being watered here, was undamaged while in a fork truck that fell 4½ feet off the shipping dock.

This extreme example presents one of the vital advantages you can enjoy with EDISON. The EDISON cells are steel cells, with plates and poles of steel—assembled with modern machine tool precision. Such construction means unequalled battery strength for rugged daily battery service and extremely long service life. For thousands of EDISON users, this has meant top performance for *more than twice the life* of conventional batteries . . . and the lowest over-all battery costs possible.

Learn more of EDISON'S superior advantages for profitable industrial truck operations. Request a visit from the EDISON Field Engineer nearest you. Write Edison Storage Battery Division, Thomas A. Edison, Incorporated, West Orange, N.J.

Most dependable power... lowest over-all cost you get both with an EDISON

EDISON

Nickel • Iron • Alkaline

STORAGE BATTERIES

EDISON ALSO MAKES THE FAMOUS "V.P." VOICEWRITER AND THE TELEVOICE SYSTEM

Circle No. 63 on Reader Service Card for more information

Steel Handling Equipment:

Republic Steel Corporation has published a new catalog, one covering the principal products of its Pressed Steel Division. Included is information on steel boxes, skids, pallets, foundry flasks and stampings.

Circle 255 on Reader Service Card

Electric Power:

A bulletin entitled "Engineering Services for Users of Edison-Equipped Industrial Trucks" is available from Thomas A. Edison, Inc. It explains to the potential user of Edison batteries what he may expect in the way of inspections, personnel training and recommendations.

Circle 256 on Reader Service Card

Multi-V Drives Handbook:

A 76-page, illustrated multi-V belt engineering handbook, featuring a convenient guide to the design of standard and high capacity drives, has been published by The B. F. Goodrich Company, Industrial Products Division. New horsepower rating tables closely approximate actual operating conditions and reflect the increased ability of modern belts.

Circle 257 on Reader Service Card

Automatic Gluing and Taping:

An illustrated bulletin describing a new machine that automatically glues and tapes shipping containers in one pass is available from the Clybourn Machine Corporation.

Circle 258 on Reader Service Card

Fork Truck Operation:

Mercury Manufacturing Company has produced a four page reprint titled "Proper Operator Judgement Cuts Cost of Fork Truck Operations". It deals with the correct methods of operator training.

Circle 259 on Reader Service Card

Certified Job Study:

Anyone interested in reducing material handling costs will want to read a new Certified Job Study folder published by Towmotor Corporation, which gives details on the Bigelow-Sanford material handling problems, before and after the purchase of Towmotor fork trucks.

Circle 260 on Reader Service Card

NEW DIVISION AT KEMTEK

Kemtek Corp. has announced the forming of a new division for the fabrication of vacuum formed products. Chief among the new division's products will be streamlined plastic containers with interchangeable tray inserts and transparent covers. Al Thomas, formerly with Bendix Aviation Corp., has been named general manager of sales and services of the new division.

Scoopmobile

MODEL C

Many Uses

Power steering—planetary drive—three-wheel maneuverability. Scoops, loads, hoists, transports. Optional attachments include lift forks, concrete swivel hopper, adj. angle blade, hay forks, crane boom. Call or write for complete information.

MIXERMOBILE DISTRIBUTORS, INC.
8027 N. E. KILLINGSWORTH
PORTLAND 20, ORE.

• Scoopmobiles • Duo-Way Scoops and Lifts • Stationary Mixers
• 4-Wheel Drive Scoopmobiles, Dozermobiles, Tractors • Mixermobiles

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Fork Truck Information in Any Language:

Publication of catalog condensations in seven different languages has been completed by the Hyster Company. Copies are available in either French, German, Italian, Norwegian, Portuguese, Spanish or Swedish.

Write 261 on Reader Service Card

"Junior Beams":

A 20-page booklet describing the uses of Jones & Laughlin Steel Corporation's light structurals, "Junior Beams", has been published. The booklet contains pictures showing how the light structurals are adapted to floor and roof design in buildings, and to miscellaneous uses such as truck and trailer frames, ship building, and grandstand construction.

Write 262 on Reader Service Card

Wire Stitching Catalog:

A catalog on the subject of wire stitching corrugated and solid fibre boxes and the machines used in the fastening process has been published by Acme Steel Company. Bulletin AD131 contains 24 pages of information on the ability of wire stitching to make better boxes at lower cost.

Write 263 on Reader Service Card

For Terminal Operators:

How motor freight terminals are using the tow-truck method of handling to cut costs, eliminate scrambled shipments, and increase tons-per-manhour while reducing employee fatigue is shown and explained in a four-page illustrated case study available from The Rapids-Standard Co., Inc.

Write 264 on Reader Service Card

Adjustable Dock Ramp:

Newly detailed and illustrated information concerning the Model No. 4 M.F. hydraulic adjustable Adjust-A-Dock, is available from Rowe Methods, Inc. This 20,000 pound capacity unit provides a quick and adjustable ramp to connect a loading platform with the bed of a highway truck.

Write 265 on Reader Service Card

BEST MANAGED . . .

(Continued from page 73)

load quantities, that weekly receipts of many items may be as few as one or two cases. Under such conditions, individual piles for each of the items handled would result in prohibitive amount of space and as a result, we may have three or four different brands in the same pile. The balance point between space and labor charges for this type of operation is quite difficult to determine.

Our standards as to what constitutes adequate work or storage space are based on a calculation of these areas as a percentage of the total. Thees percentages in turn, are based upon our experience with existing stores and their problems. This approach gives us a fairly reliable working guide, but it is still influenced by the most unpredictable variable of all—the ultimate sales level of the store. Normal deviations from 15 to 20 percent of expected volume are not unusual and have a corresponding affect upon inventories and work areas.

Handling Mechanized When Possible

The majority of Grand Union's existing stores, and all of our new stores, utilize mechanical handling wherever possible. The equipment used consists of gravity wheel conveyor, belt conveyors, platform lifts and flat trucks. The application of this equipment in a typical supermarket with a basement is illustrated on Figure 1, Part A. Of the nine operations shown on this flow diagram, the last five take place on the store floor. This is significant from the viewpoint of aisle congestion, shopper interference and general appearance. The effect of gravity-feed type shelving on this operation is illustrated on Figure 1, Part B. In this operation three handling steps have been eliminated and all stocking takes place from the rear of the fixture.

(More on next page)

BAGS, BULK, BARRELS, BOXES MECHANICALLY!

You can save time and money with increased safety by installing a Cesco Skip-Hoist Dumper. Lifts, upends and dumps 100 loads per hour with a lifting capacity range from 100 to 1500 lbs. Single and multi-purpose portable models in standard heights from 6 to 10 ft. Stationary models to 20 ft. Easy, safe operation from push button controls speeds up material handling and eliminates accidents.

Write for complete catalog . . .

ESSEX CONVEYORS, INC.
165 Franklin Avenue, Nutley 10, N. J.

COLSON EQUIPMENT & SUPPLY CO.
1317 Willow Street, Los Angeles 13, California

CESCO SKIP-HOIST DUMPERS

Circle No. 52 on Reader Service Card

Circle No. 70 on Reader Service Card for more information

FULLY AUTOMATIC!

A Loader with a Mechanical Brain!

SELF-STOPPING

SELF-LEVELING

SELF-STARTING

New, revolutionary loading platform automatically carries loads from loading dock to truck floor, whether truck is above or below dock. Can also be installed at ground level. Motion controlled by switch bar in platform and by self-leveling ramp. Human element eliminated! No hand switches! Exact levels! Models 6000 to 20,000 lbs. Write for descriptive literature.

LOAD-O-MATIC* * Pat. App. for

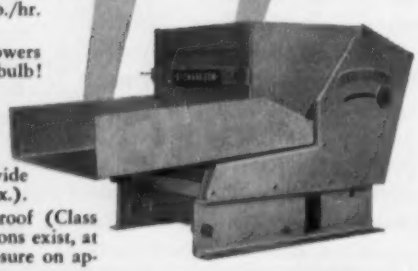
FIELD ENGINEERING PRODUCTS CO. 66 FOOTE AVE. JAMESTOWN, N.Y.

VERSATILE BULK FEEDING...

from a trickle to a torrent with VELOFEEDER

A mechanical vibrating feeder especially designed for all materials such as sugar, bran, pellets, feeds, chemicals, and grains at lower cost, higher efficiency.

Here's Why!



Higher Output—300 to 50,000 lb./hr. hard granular materials; 300 to 30,000 lb./hr. soft ground materials.

Lower Power Needs—⅛ hp. motor powers unit—inexpensive as a 100-watt light bulb!

Smaller Space Needs—35 inches long, 17½ inches wide, 19 inches high. Standard vibrating tray 16 inches wide—stainless steel when required.

Easier Control—simple adjustment over wide operating range (near 0 to 50 fpm. max.).

Safer Operation—motor is explosion-proof (Class 2, Group G), where hazardous conditions exist, at slight extra cost. Complete dust enclosure on application.

Less Vibration—working frequency is 1850 vibrations per minute; little or no vibration is transmitted to mounting installation (mounts with only 4 bolts!).

If you're interested in better bulk feeding at lower operating cost, write for Bulletin 5302 with complete specifications and drawing.

1052

Richardson SCALE COMPANY, Clifton, New Jersey

Atlanta • Boston • Buffalo • Chicago • Detroit • Houston • Memphis • Minneapolis New York • Omaha • Philadelphia • Pittsburgh • San Francisco • Wichita • Montreal Toronto • Havana • Mexico City • San Juan

MATERIALS HANDLING BY WEIGHT SINCE 1902

Circle No. 134 on Reader Service Card for more information

Figure 2, Part A, illustrates the handling sequence through a market with sales and storage on the same floor. This operation has eight steps, the last four of which are on the sales floor. The use of the gravity-feed stock shelves reduces this total to five and eliminates the sales floor stocking (Figure 2, Part B).

Typical Installation

Photographs show the front view of a typical installation and a view of the loading operation behind the self-loading shelves. This type of equipment has also been adapted to general warehousing in unrelated fields.

In general, these diagrams and pictures illustrate more than the details of individual operations. They also show the fact that we in the food chain industry are really in the material handling business. We must take cognizance of this along with the premise that all material handling is a complete economic waste which adds no value to our products. It is imperative that we improve or eliminate our handling operations wherever possible.

Self-Service Saves

Self-service eliminated millions of dollars per year in clerical salaries. We eliminated an operation when we encouraged our customers to unload their own shopping carts while awaiting checking. We have improved our handling through the use of the gravity-loading shelves, conveyors and improved checkout booth design. Proper market layout can reduce walking effort tremendously, with attendant reduced costs.

Many operators regard their space and handling problems as mundane and are still awaiting the development of the so-called automatic store to solve all their problems. We are not convinced that such development will come in the forseeable future. We believe that our best hope of improvement is within the framework of our existing operating methods.

BULK . . .
(Continued from page 77)

tion of ratio v/w, which will be called unit pressure; w is the unit weight of the material. By using ratio v/w for the abscissa instead of v, the diagrams are made independent of unit weight, and the family of curves represents all materials.

Starting from the top of the filling, unit pressure v/w increases linearly at the rate of one. That is, the pressure is hydrostatic. However, unlike the pressure in a liquid, pressure in a bulk solid reaches a maximum at some depth less than h, and drops to zero at the apex of the hopper. The character of the pressure curve is described sufficiently by the value of angle Ψ.

Test Results

Results of tests of unit pressure made in a model hopper are shown in *Fig.* 3. A photograph of the hopper with gauges set up for the test is shown in *Fig.* 4. The gauge comprises a pressure disc with a copper tube leading out of it and connecting to a plastic tube. The gauge is filled with a colored liquid. Details are shown in *Fig.* 5. Under the pressure of the material, the diaphragms of the disc are compressed and the reduction of the volume of the disc sends the level of liquid up in the plastic tube. The difference of levels is a measure of the pressure applied to the diaphragms.

Pressure Pattern

To visualize how the pressure pattern forms within the material in a bin, let us consider an empty hopper and feed material into it without impact.

At first, the deposited material is in Rankine state of plastic equilibrium. As new layers are added and vertical pressure is increased, material shears and flows along lines inclined at an angle $45° - \varphi/2$ to the lines of major pressure[2]; φ is the angle of internal friction of the solid. Typical lines of shear are shown in *Fig.* 6. As long as material is in the Rankine state, the vertical pressure increases linearly. A deviation from this pattern results from the in-

production line . . .

or shipping room

Nearly 50 years of conveyor experience

Standard cuts conveying costs in *either* or *both* places

To speed operations, reduce breakage, increase safety, save manpower, time and money — mechanize handling with Standard conveyors. *It's an investment in efficiency that will pay you for years.*

Standard can be of expert service to you on any conveyor need. This includes complete engineered systems of conveyors for production, assembly or packing lines . . . or a simple lightweight section of roller conveyor for "spot" use in warehouse or shipping room.

Standard designs and builds all types of "package" conveyors: power and gravity, belt, roller, slat, push-bar and special units as well as a wide line of self-contained portable work-savers.

The range, versatility and flexibility of Standard Conveyor equipment have been developed in nearly 50 years of service to industry. Call Standard's representative listed in your classified phone book. Send for Standard's General Catalog—address Dept. FL-104.

STANDARD CONVEYOR COMPANY
General Offices: North St. Paul 9, Minnesota
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GRAVITY & POWER Conveyors
ROLLER • SLAT • WHEEL
SECTIONAL • BELT • CHAIN • PUSH-BAR
PORTABLE CONVEYOR UNITS:
HANDIBELT • INCLINEBELT • EXTENDOVEYOR • UTILITY BELT-VEYOR
HANDIPILER • LEVEL BELT • LITEWATE • HANDIDRIVE
PNEUMATIC TUBE SYSTEMS

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Circle No. 60 on Reader Service Card for more information

1ST AND STILL KING

BARREL AND DRUM TRUCK

THE DICO "Float-away"

. . . yes, the original "Float-away" is still your best buy for barrels and drums!

Quick and easy loading—axle and wheels never leave the floor in loading process. Stands by itself when not in use—an important safety factor. Handles "bilged" or straight-sided barrels equally efficiently. Equipped with DICO "HD" indestructible steel "Molded-on" rubber tired, roller bearing wheels.

SEE YOUR JOBBER OR WRITE FOR CATALOG

"ALL-STEEL" TRUCKS for LONGER WEAR and MAXIMUM STRENGTH

DICO

DES MOINES 5, IOWA

Most Specified for ORIGINAL EQUIPMENT POWER

WISCONSIN HEAVY-DUTY Air-Cooled ENGINES

3 TO 36 HORSEPOWER

3 to 6 hp.

6 to 9 hp.

7 to 15 hp.

15 to 36 hp.

In the design, manufacture, and ultimate use-purchase of mechanized field and industrial equipment . . . Wisconsin Heavy-Duty Air-Cooled Engines are specified as Original Equipment Power Components to a greater extent than any other make of engine, within a 3 to 36 hp. range.

This dominant preference must necessarily be based on actual *performance records* of users . . . because Wisconsin Engines are not sold on a "price" basis. These engines have the inherent Lugging Power that *stays with the job*, eliminating "stop-and-go" delays, saving manpower and manhours . . . and delivering "Most H. P. Hours" of on-the-job service, with minimum servicing.

If this makes sense to you, let's get together. Write for engineering and descriptive data.

Power TO FIT THE JOB

Power TO FIT THE MACHINE

WISCONSIN MOTOR CORPORATION

World's Largest Builders of Heavy-Duty Air-Cooled Engines

MILWAUKEE 46, WISCONSIN

A 7991-1/3

Circle No. 162 on Reader Service Card for more information

fluence of the walls.

In a level mass of material, unlimited by walls, individual particles move along planes inclined at an angle $45° - \phi/2$ to the major pressure—i.e., to the vertical—but the resulting movement across the mass is vertically downward.

In a hopper, however, at the walls the resulting movement is deviated from the vertical toward the center. The result is a wedging action which compacts material laterally, increases the horizontal component of pressure beyond the Rankine state, and produces an arching effect. Simultaneously, vertical pressure along the center line decreases. Influence of the walls is the greater the narrower is the section of the hopper. Thus it is greatest at the apex of the hopper.

If Slope Angle Is Increased

As the slope angle of the walls α is increased and the angle of friction between material and wall decreased, a condition is reached when material slips bodily at the walls. A large part of the mass in the hopper undergoes a wedging action and lateral compaction, with resulting shift of conditions away from the Rankine state—and with a more pronounced deviation from the hydrostatic distribution of pressure. Angle Ψ of *Fig.* 2 increases.

A typical pattern of principal pressures is expected to be as shown in *Fig.* 7. In the upper part of the hopper, material is in the Rankine state, i.e., the major pressure is quite close to vertical. Toward the apex, the influence of the walls becomes more pronounced and a definite arching action develops at the bottom of the hopper.

In those cases in which there is no slip of material along the walls, the influence of wedging on pressures is small. Therefore, in view of the fact that the opening of the hopper is always some height above the apex, it is sufficiently accurate to assume a linear pressure distribution—that is to assume $\Psi = 0°$ in *Fig.* 2.

The slope angle beyond which slip occurs and the shape of the pressure curve which material then assumes can only be determined experimentally. They depend on the material, the coefficient of friction between material and wall, and the height, h, of material in the hopper. To present this phenomenon quantitatively, it is suggested that: a standard hopper be made, and angle $\Psi = \Psi_0$ be measured for a few typical materials; the tangent of Ψ_0 be called the pressure factor of the material; and the relation between angle Ψ_0 and angles Ψ obtained in hoppers of other shapes and for other heights of material be established.

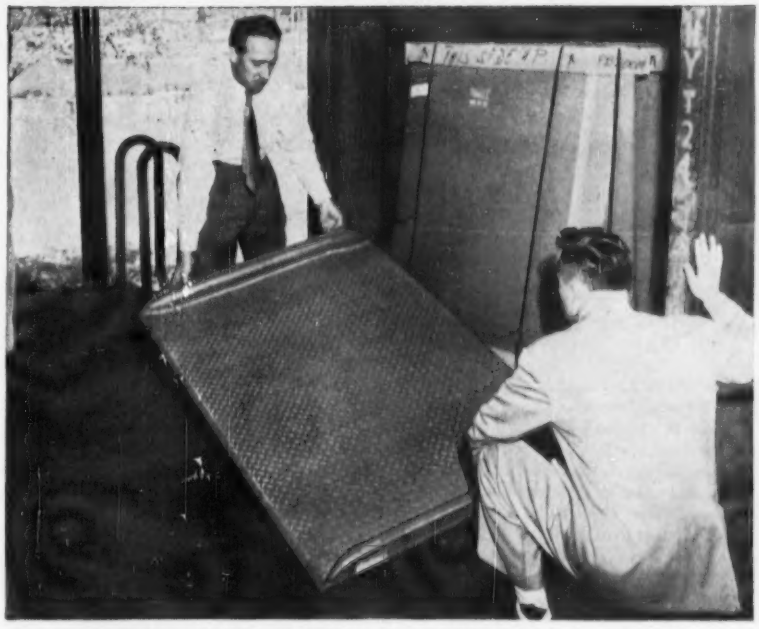
Pressure in Bins

Tests made on model bins as well as other evidence[3] show that material in the vertical portion of a bin has practically no influence on pressures in the bottom part of the hopper and, therefore, does not affect the flow of material through the hopper. Figure 8 shows the results of measurements of the vertical pressure along the center line of a model bin at four levels of material.

In general, a pressure diagram can be constructed as shown in *Fig.* 9. It is evident that there are two cross sections of the bin at which pressure reaches maximum values—one is at the opening of the hopper and the other at the transition from the vertical portion of the bin to the hopper. As long as h is larger than h_1, the critical condition for doming remains at the outlet of the hopper. For h_1 larger than h, however, the largest pressure occurs at the transition, and it is there that material develops the greatest strength. As the gate is opened, it may well happen that material above the gate fails and disintegrates up to some height, as shown in *Fig.* 9.

Above that height, material domes and remains stable. Stable material around the core now undergoes an intense wedging action, and it may fail outright so that the whole mass flows simultaneously. This is likely to happen in

[3] *"Clogging of Bituminous Coal in Bunkers," by R. F. Legget, Trans. ASME, vol. 69, 1947, p. 525.*



James Johnson, vice president of J. W. Johnson Co., positioning Magcoa Dockboard during talk with Magcoa representative

"Our Magcoa Dockboard speeds loading . . . pays for itself"

says James Johnson, Vice President, J. W. Johnson Co., canvas goods manufacturers, Bellwood, Ill.

"When we switched from heavy, makeshift steel plate to an engineered-for-us Dockboard, we chose Magcoa," says Mr. Johnson. "Our Magcoa Dockboard can be positioned quickly and easily by one man," he continues, "and when it's in position, *its safety angle holds it there.* Our powered equipment and operators handle loading and unloading in record time, and are then free for other handling jobs throughout the plant. We figure," says Mr. Johnson, "that our new Magcoa Dockboard will quickly pay for itself."

HERE'S THE SECRET behind the cost-cutting efficiency of J. W. Johnson Company's Magcoa Dockboard . . . and thousands of others like it across the country.

First, The Magcoa Representative personally checks all requirements: dock height, span, equipment underclearance, axle load, and many other factors that influence Magcoa Dockboard design and construction.

The next step is engineering—and Magcoa Engineers are materials handling experts. They utilize exclusive Magcoa design principles proved in thousands of successful installations . . . to make sure your Magcoa Dockboard will give the service expected, and more.

Then, Magcoa's mass-production plant takes over, where rugged angles and channel sections are welded to the bottom of Magcoa Dockboards . . . to give more than adequate structural strength and to lock the board securely between dock and carrier, regardless of the thrust of heavy, powerful lift trucks and pallet trucks.

Magcoa Dockboard in action under watchful eyes of Roy Gilbert, Buyer, Magcoa Representative and James Johnson.

YOUR MAGCOA REPRESENTATIVE FOLLOWS THROUGH when your Dockboard is delivered . . . to make sure that you know how to use it most effectively in speeding your loading and unloading, so that it can pay for itself in the shortest possible time.

MAGNESIUM COMPANY OF AMERICA

MATERIALS HANDLING DIVISION, EAST CHICAGO 1, INDIANA

DIVISION OFFICES: New York 20 • Philadelphia 18 • Washington 5, D.C. • Houston 17 • El Segundo (L.A.) Calif. • San Francisco 4

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a sufficiently steep hopper. On the other hand, failure of the wedge may be delayed until some of the material of the core has emptied out.

A troublesome situation arises. As material flows out, a void is formed inside the bin. When, at last, the wedge fails, the mass of material drops, picking up speed until the void is filled, and then material is brought to an abrupt halt. The resulting shock compacts the material. The larger the void, the heavier the compaction. This situation often leads to serious obstructions to flow. If the wedge can withstand the pressure, the core empties out, and a stable dome forms at the top of the empty core. When the dome is broken up with vibration or prodding, material comes down with a thump and compacts heavily.

Strength that a solid develops increases as compacting pressure is increased. Thus, it is advantageous to keep compacting pressure in the material as low as possible. A few methods of accomplishing this follow:

Pressure Breaker

This is, essentially, a horizontal shelf placed at the center of the hopper to help support the material above it (*Fig.* 10). As a result, pressure below the breaker is reduced, as is the compaction of the material so that it can flow through a smaller opening. The section around the breaker has to be checked for flow. Its shape can be assumed as an infinitely long rectangle. The pressure breaker has found successful application in the Northwest in domestic heating installations burning sawdust. A sheet-metal cone suspended in the hopper prevents sawdust from doming.

Vertical Partition

In a tall bin, this can reduce compacting pressure at the transition from the vertical portion to the hopper. The arrangement is shown in *Fig.* 11. The principle of operation is based on the fact that partitions reduce the effective

diameter of the bin. Maximum value of pressure does not exceed the weight of a layer equal to about 2 diameters.

Horizontal Ledges

Within the bin, these also can be used to control the compacting pressure. This is shown in *Fig.* 12. It is advisable to keep all peaks of pressure below the pressure at hopper opening. In this way, danger of doming across the funnel is eliminated.

Impact Pressure

Impact pressure is an important factor in the flow of material in tall bins with very steep hoppers, as well as in chutes and spouts. Assuming a feed into a bin at a steady rate, Q, striking the top of the filling at speed, v, the impact produces the following force acting on the filling:

$$F = \frac{Q\,v}{g}$$

The force is proportional to the rate of feed and to the striking velocity. Assuming that the falling lumps are sufficiently large for air friction to be neglected, we have:

$$v = \sqrt{2\,g\,h},$$

and

$$F = Q\,\sqrt{\frac{2\,h}{g}}$$

where h is the height of free fall. To appreciate the order of values, let us consider an example.

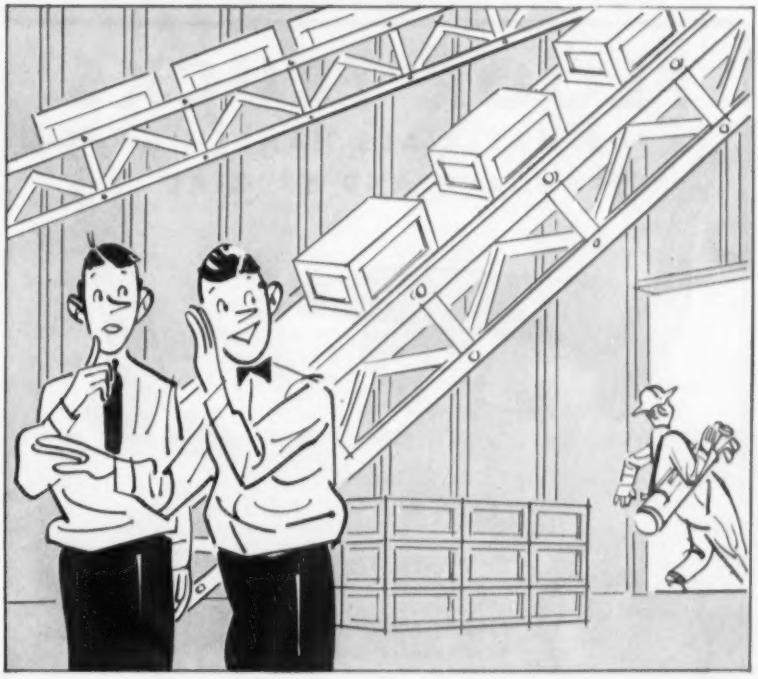
Material of unit weight w = 100 lb. per cu. ft. falls through a distance of 30 ft. at the rate Q = 500 tons per hr. We have a force:

$$F = \frac{500 \times 2000}{3600} \times \frac{\sqrt{2 \times 30}}{32.16} =$$

380 lb.

Assuming that material strikes an area of 1 sq. ft. of the filling, the impact pressure is 380 psf. This is equivalent to the static pressure of a 3.8 ft. high layer of material. We should multiply this result by a factor of, say, 2 to allow for the fact that the peak rate of feed is bound to be higher than the average rate, Q.

Then we obtain a pressure equivalent to a layer of 7.6 ft. of material. This is not significant, compared with the static pressure



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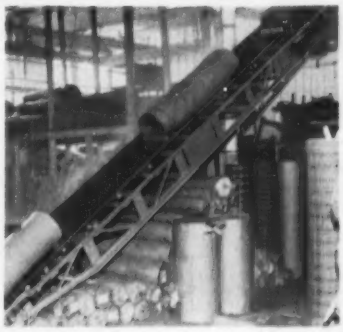

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in a bin designed for a pressure angle $\Psi = 0^0$, but it may be critical in a hopper with very steep walls and an opening designed for $\Psi > 0^0$.

Therefore, the latter design is used only for aerated, fine or flaky materials with velocity of fall controlled adequately by air friction. The aeration of a fine material is essential because, if the material is allowed to settle before it is charged into the bin, it does not disintegrate completely during the fall—it falls in lumps and may gain full velocity:

$$\sqrt{2\,g\,h}.$$

The velocity of coarse materials often can be reduced by placing an impact breaker in the path of the falling material. The resulting scatter further reduces impact pressure.

Impact pressure takes on particular significance in chutes and spouts. The largest static pressure here does not exceed the hydrostatic pressure in a layer of material of height equal to 2 diameters of the spout or chute. For a spout of 1 ft. diameter, static pressure is about 2 ft. of material. This value can easily be exceeded by impact pressure.

To prevent impact pressure from arising in a spout, it is necessary to avoid bringing material to an abrupt halt within the spout. This can be accomplished by suitably locating gates or feeders. Such locations are shown in *Fig.* 13. In (*a*) the gate is at the top, the chute feeds out, and no material is ever stationary within it. In (b) the spout is always full of material and a gate—or, preferably, a feeder—is placed at the bottom of the spout to keep the velocity of flow under control at all times. In operation it is attempted to keep the spout always filled with material.

Vibrational Pressure

Prolonged vibration of a material leads to the escape of entrapped air and a rearrangement of particles, increasing density of

material and its strength. There are cases in which vibration cannot be avoided—for instance, when a coal bin is mounted on a locomotive. Usually the vibration of a bin structure is either the result of supporting the bin from a building structure—which is subject to shock and vibration from cranes, vehicles and machinery—or the result of mounting vibrating screens or crushers directly on the bin.

Bins designed for $\Psi > O^0$ should be insulated structurally from sources of vibration. Otherwise, the effect of vibration can only be accounted for by allowing a liberal factor of safety. Vibration can be particularly harmful in the case of spouts which operate full of material. Spouts have small diameters, and vibration can easily build up the little strength required to produce doming.

This article, including the conclusion next month, has been prepared from a paper given before the Material Handling Division of the American Society of Mechanical Engineers at their recent Semi-Annual Meeting in Pittsburgh.

The conclusion will take up the development of the "Flow Factor" concept, leading to the simple formulas governing the flow of bulk solids.

WHAT'S WRONG . . .

(Continued from page 86)

of standard performance data under a wide variety of conditions should be made available so that they can be used in working out solutions or alternatives, and in designing matched, integrated handling systems to solve specific handling problems. Such information is not available in usable form today. To get it will require research and expenditures of money. It will come eventually—and the sooner the better. Certain segments of the industry have done more than others, but much remains to be done.

Another critical area is the standardization and control of handling operations. This means time standards with measurement and control of operating performance with reference to those standards. This does not mean that handling operations must be put under a wage incentive plan. They may or may not be, as desired. The whole question of incentives in industry is currently being scrutinized by more and more firms, and many are discarding wage incentives.

The necessity for good time standards cannot be eliminated, however. One of the biggest fallacies in the minds of many today is that time standards mean wage incentives. Nothing is further from the truth! Time standards are vital to the control of operations—production control, inventory control, material control, cost control, quality control. Without time standards, control cannot effectively be achieved. This is a job for both industry and educational

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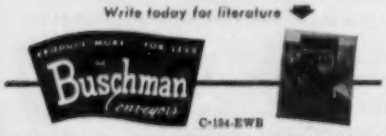

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institutions—to devise better and better methods of measurement and control so that they (the standards) can be obtained easily and at a low cost. Further, more quantitative measures must be available for design and control purposes and less reliance placed on qualitative observations and intuitive judgement.

4. Papers Need More "Why"

The level of Material Handling could be raised if more of the papers presented at technical meetings told more of the "why" rather than so much of the "how." When concentration is on the "how," writers get involved in equipment and its characteristics. If we could spend a little more time explaining "why" we do or do not do things—"why" certain designs are effective and others are not, "why" certain practices and procedures are used while others are not—then perhaps more people would have more insight into some of the problems of handling material.

Very little of what is written tells "why" designs are necessary to suit the characteristics of the process from a handling standpoint, the characteristics of the preceding or succeeding processes, storage, etc. The dissemination of such knowledge gained by those who have a chance and an opportunity to obtain it is necessary if Material Handling is truly to become a science.

5. Management Responsibility Required

Material Handling as an activity must be recognized by management and given its proper place at the conference table.

Industrial Engineering is extremely broad in its definition; the American Institute of Industrial Engineers is constantly trying to find a better definition of the work referred to by adding the adjective "Industrial" in front of the word "Engineering".

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rials. Just as in any company meeting, or organization specification —where the areas of Industrial Relations, Purchasing Accounting. etc., are given a high place in the heirarchy of Industrial Management, and recognized as such—the function of Material Handling must be given its high place in the heirarchy of Engineering. When a decision on a product design is to be made, certainly a product designer participates. How can an intelligent and informed decision be made without the advice and counsel of a person trained in the science of, and conversant with, available methods for handling the potential materials which are to be part of the finished product? Such a decision wouldn't be made without the advice of a tool engineer who is conversant with the production problems involved. How, logically, can the same decision be made without the benefit and experience of the man responsible for handling the materials and products involved? After all, the Material Handling people will see much more of the materials—and hold them for a longer time by far than the tool engineer ever will.

The Material Handling function must be recognized for what it is, what it can be, and placed at a high level of the engineering organization so that good handling practices can be considered from the start. It should not become the step-child which has to be called upon to put out the production fires of inefficiency and high cost after they have been lit by others.

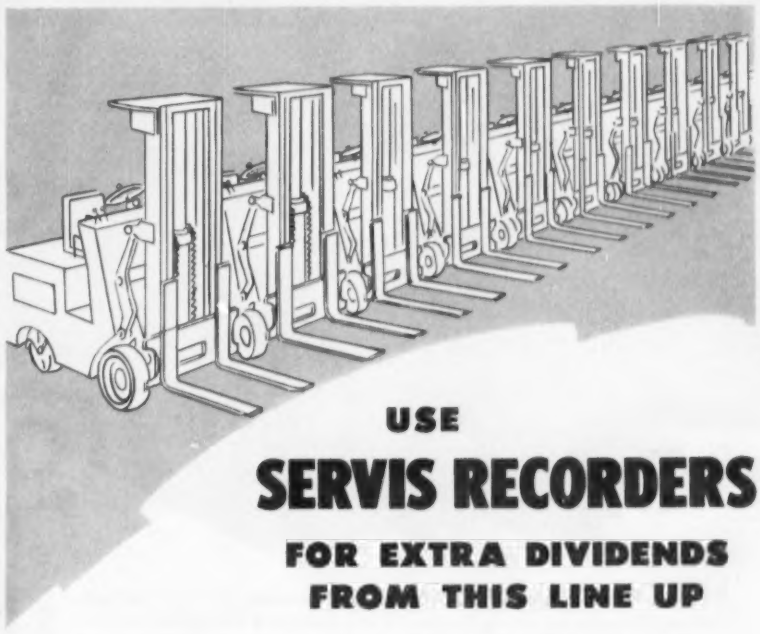
6. Research is a Real Need

There is the necessity for more and better Material Handling research. The author, a member of the College-Industry Committee for Material Handling Education, is concerned with this problem very directly. It is obvious that Material Handling research will have to be intensified and greatly expanded if the benefits of continued progress in the field are to be realized.

Many of the things suggested above concern research problems. An attitude and acceptance of research in the field must be created and the cost recognized. Industry can do some of the research itself. It will have to because it is the only available entity for setting up some of the hypothetical conditions and controlled situations that are necessary. Other research will have to be done by the educational institutions. Where this is done, industry will, in turn, have to support it with its good will and good pocketbooks.

Research is not cheap, but its fruits are well known to those familar with the industrial history of America. We in Material Handling must think in terms of research, new ideas, better dissemination of information, and a constant desire to add to the knowledge concerned with methods, equipment, and control of Material Handling operations.

It is true that, as we learn more and improve our science, we shall probably be more critical and realize that we know less. This is inevitably the result of progress and proof that we are still in a challenging and dynamic field.



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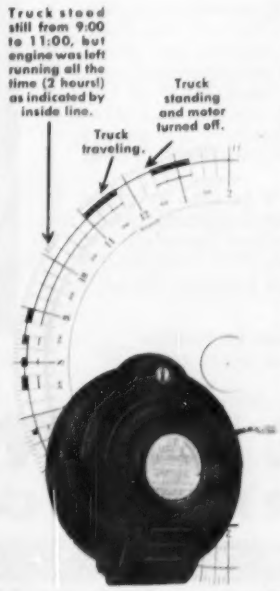
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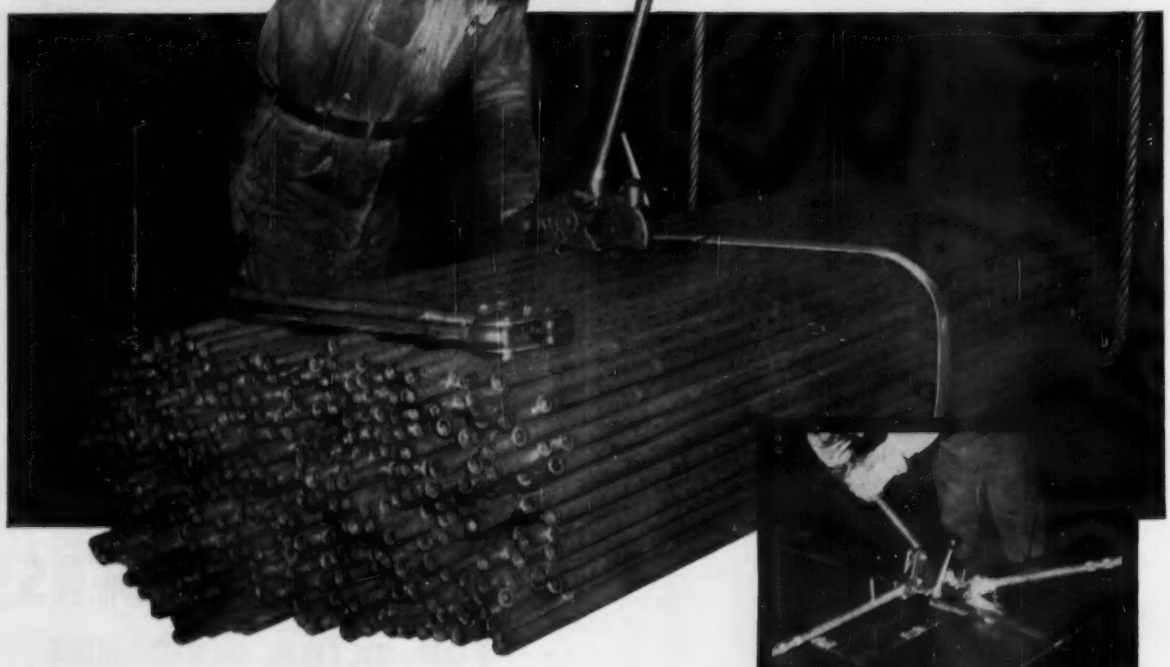

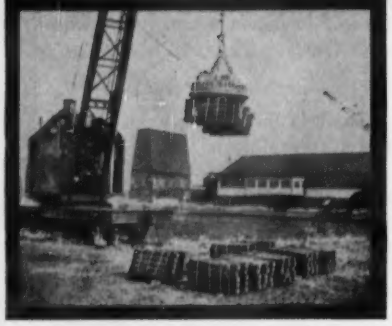

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TABLE OF CONTENTS

You Pay for Damage Insurance	132
Shock and Vibration	136
Protection Against Shock and Vibration	140
The Battle Against Moisture	144
Product Loss = Profit Loss	152
What's New in Packaging & Shipping Equipment	163

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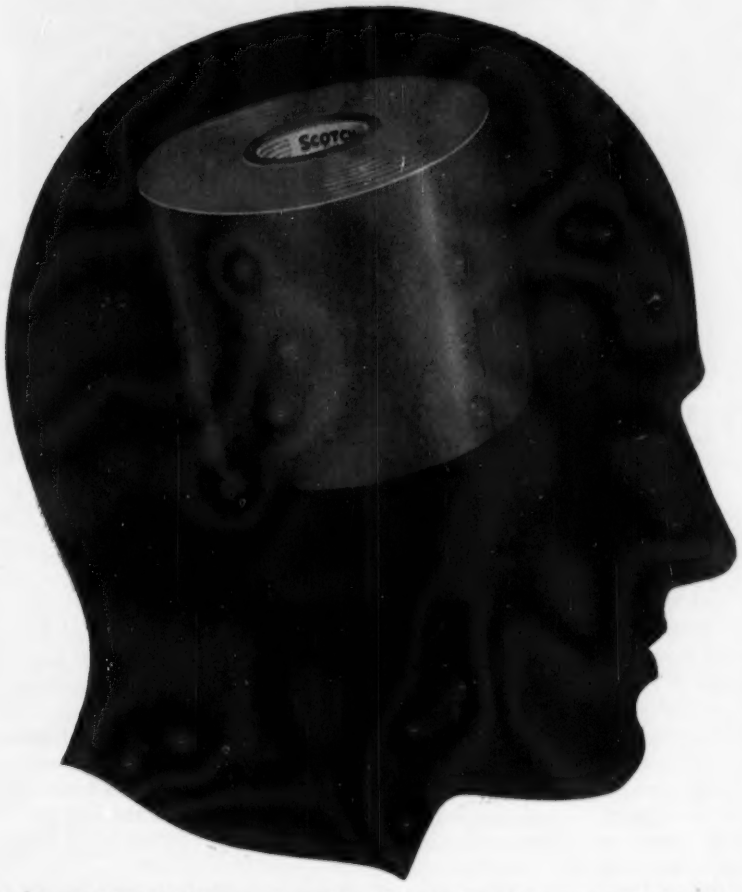

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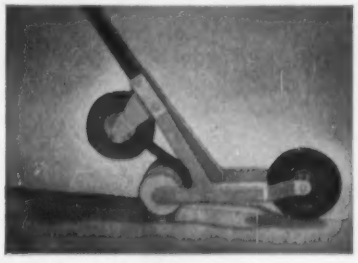

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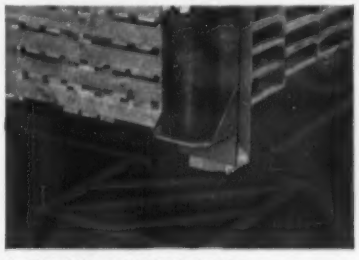

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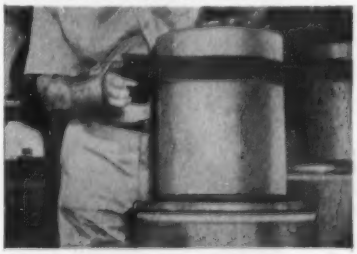

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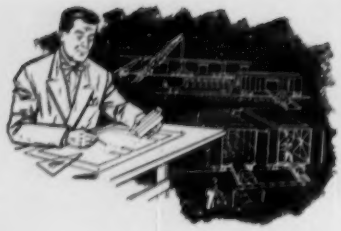

The Insurance Company Pays for Damages, but . . .

You Pay for Damage Insurance

by Alvin S. Roberts

PRUDENT and seasoned packaging and shipping men have learned that there are no bargains in either packaging or insurance. An earned reputation for good deliveries with minimum damages is to the everlasting credit of anyone who is interested in keeping the overall cost of his distribution procedure at as low a level as possible.

Loss prevention is one of the most vital responsibilities of the packaging engineer and a thorough understanding of the loss problem—who bears its cost—is essential. The first thing to do is to separate, in our minds, losses which we might label as "preventable" from those we shall call "non-preventable."

Non-preventable Losses

In 1871 Chicago was laid waste by one of the world's worst fires. It took over 300 lives, left over 90,000 homeless and destroyed property valued at almost $200,000,000!

In 1912 the SS "Titanic", the largest vessel of her time, struck an iceberg in the North Atlantic and went down with the loss of 1517 lives! Her hull was insured, as was her cargo and a great many of the lost passengers. Nonetheless, trans-Atlantic steamer travel sustained a sharp—albeit temporary—setback.

These were catastrophes, sudden in their impact and devastating in their effect. In the course of dis-

Alvin S. Roberts, assistant secretary of Insurance Co. of North America was formerly national vice president of the Society of Industrial Packaging and Material Handling Engineers and at this year's exposition is chairman of the export group in the protective packaging competition. His active interest in packaging dates back 25 years when he joined the marine service (cargo loss prevention) department of North America. During World War II Roberts acted as packaging consultant to the Office of Chief of Ordnance in Washington. He is currently vice-president of Forest Products Packaging Council in Madison, Wisconsin.

Not when you use KIMPAK 301!

New KIMPAK 301 is the practical solution to surface damage to furniture finishes during shipment. KIMPAK 301's ability to shield the fine finish against scratching makes it the ideal protective agent in a furniture package. KIMPAK 301 costs no more than ordinary materials. It is specially designed to protect against the major causes of scratching:

1. Abrasiveness of the inner spacers. KIMPAK 301 provides a scratch-free, non-disintegrating, compressible barrier between inner spacers and the furniture finish. Its conformability ensures a snug package.

2. Dust, dirt, cinders that sift into the container. The combination of high creping and porous structure—exclusive with KIMPAK 301—provides a trap for dirt, grit or cinders, which may lodge between the packaging material and the polished surface.

3. Abrasive action of harsh packaging materials. KIMPAK 301 is soft and non-abrasive . . . free from wood splinters, dirt and other abrasive materials. No lumps, hard glue spots or stiff wrinkles.

Scratching is but *one* of many problems encountered in furniture packaging. These problems are *solved* when new KIMPAK 301 is specified. For more details, contact your local KIMPAK distributor, or mail coupon below.

SPECIFY KIMPAK 301 TO SOLVE THESE INTERIOR PACKAGING PROBLEMS:

- Scratching
- Pressure-marking
- Staining
- Chafing
- Conformability
- Ease of handling
- Disintegration

Whatever your protective interior packaging requirements, there is a Kimpak specification that does the job... better!

Kimberly-Clark
INTERIOR PACKAGING
KIMPAK

KIMBERLY-CLARK CORPORATION
Neenah, Wisconsin

We would like to learn how new KIMPAK 301 can provide better protection at lower cost for our products. Please send complete information.

Name .....

Firm .....

Street Address .....

City ..... *Zone* ..... *State* .....

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You Pay For Insurance

(Continued)

". . . There are no bargains in either packaging or insurance. . .

tributing your goods around the country or around the world, were one of your shipments to run afoul of a loss like one of the above, there just wouldn't be anything that you or any other human could do about it. Who would have been able to discourage the skittishness of Mrs. O'Leary's cow or divert the iceberg?

Protection against the crushing effects of a "Force Majeure" or Act of God can be achieved through insurance. Have no illusions, however, that these are not *your* losses. Insurance only serves to distribute among the many, (through premiums) the losses of the few. Obviously the premiums you pay must be adequate to offset the losses.

Our immediate interest is with preventable losses, or more particularly, those that can be directly controlled by shippers. These are the ones which are imposing such a costly toll each day on the products of American industry and agriculture while enroute from their sources to their markets. They are the breakages and leakages, the thefts and pilferages, the fresh water and sea water damages, the bag siftings and metal corrosions. All of these can be minimized, or eliminated entirely, by properly engineered packaging protection plus intelligent handling. The safe delivery of your products is therefore clearly dependent upon the effectiveness of two vital industrial facets, i.e., packaging and material handling.

Roles of Material Handling And Packaging in Prevention of Loss

Let us speculate a moment on the respective responsibilities of these two fields of endeavor. It might be said of the packaging engineer that could he devise a means of protection strong enough to withstand successfully all normal transit hazards and make it economically practicable, then the material handling engineer would indeed have time to burn. Conversely, were the material handling engineer to develop a transporting and storing method so designed that it removed all threat of loss or damage to goods in transit, then the packaging engineer could spend long hours sitting upon his hands. Obviously, neither of these happy states is going to be achieved, for perfection in all things must be only an illusion, else we stagnate.

It therefore behooves the specialists in both of these fields to get about their collective business of cutting down the uncounted millions of dollars bled annually from our business arteries due to these directly preventable losses. Make no mistake about it, this waste of our resources is just as needless as our annual timber losses from forest fires that are touched off by moronic picknickers and alleged campers.

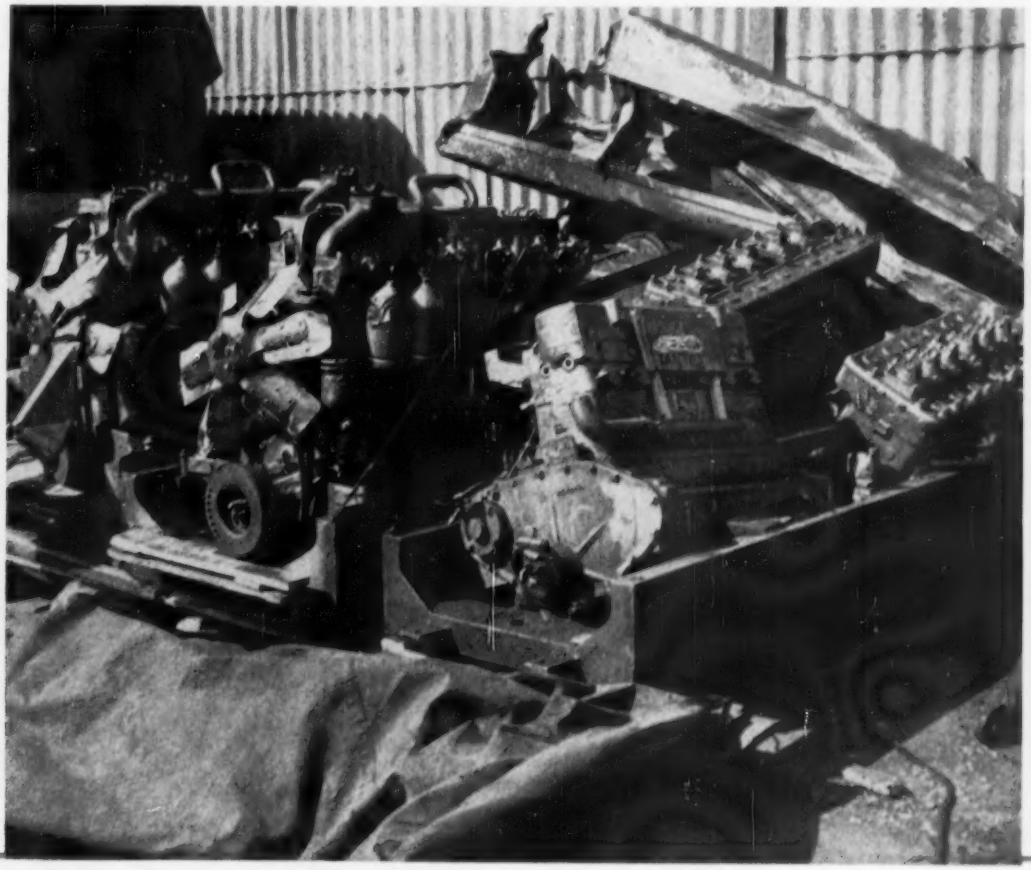
Can we put an actual price tag on our shipping losses? I fear not, for they are both direct and indirect, tangible and intangible.

On the direct and tangible side of the ledger we can point to the steadily mounting loss and damage figures of the Association of American Railroads, whose members reported over $111,000,000 for 1953. While detailed statistics of U.S. motor truck cargo losses are not maintained, American Trucking Asso-

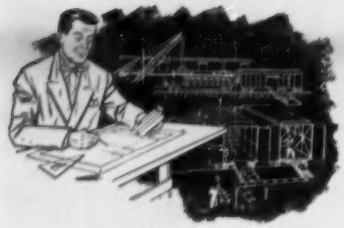
(Continued on page 174)

premium pays for preventable losses. . . Preventable losses can be minimized

Losses are ultimately for your own account. . . A substantial part of the



by properly engineered packaging plus intelligent handling. . .”



An Engineering Approach to

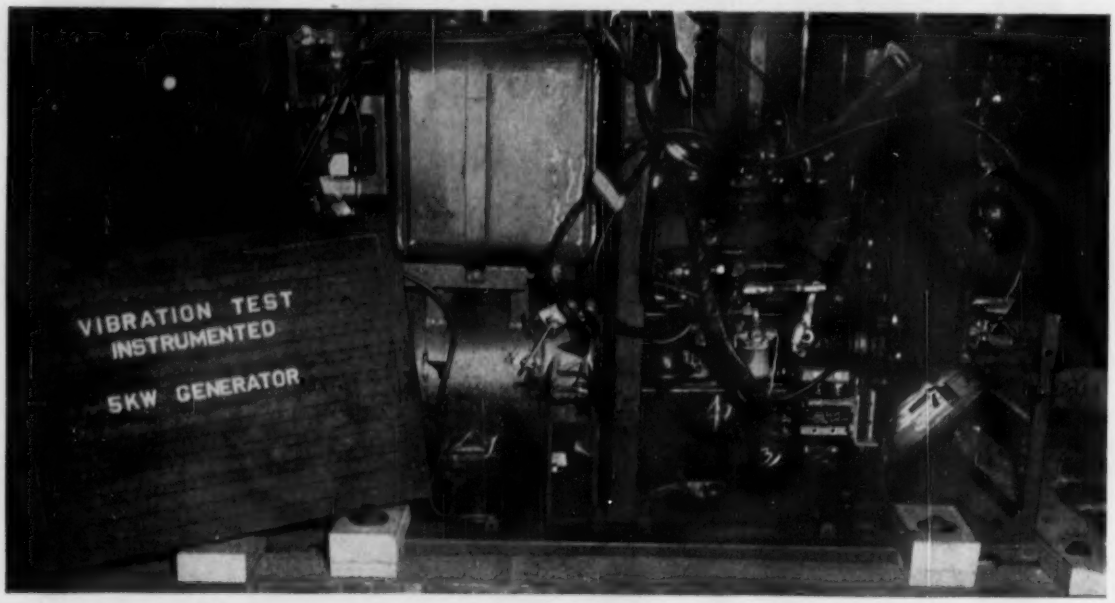
Shock and

by F. Stowell, H. C. Pusey, K. M. Carr
Engineer Research and Development Laboratories
Corps of Engineers, U. S. Army

THE reluctance, in past years, of technical people to consider packaging as a design factor has resulted in billions of dollars of losses in damage and a proportionate sum expended for excessive packaging to reduce the damages. Recently, however, more and more technical personnel have become engaged in the study of packaging problems. Through their efforts, an "art" is becoming a science.

There are few items designed today with any thought as to how or where they will be shipped and handled. Packaging is seldom considered by the product designer who usually does a complete job of developing only the operational characteristics of the product. Then, he calls in the packers.

In the beginning, the packer's materials were not necessarily designed to produce the needed results, but merely to provide stuffing for the space between the item and the container. The effectiveness of the packaging was determined by the degree of damage encountered or number of total losses per number of units shipped. A second step was comparative testing . . . this still is the major method of analyzing package designs. It came about by packers' attempts to duplicate successful packages for certain items on other items. This was practically as far as the pack-



INSTRUMENTED VIBRATION TEST can be conducted on equipment itself to study the possibility of modification of equipment to ease the packaging problem. This test includes measurements for strains, accelerations and velocity. Cooperation between design and packaging engineers can often result in greater protection (for products to be shipped) and, at the same time, a reduction in packaging and handling costs.

Vibration

ager was concerned because his materials as well as his knowledge were limited.

It follows that losses could be reduced by testing these similar packages to determine the similarity of protection afforded. Many materials are now available to produce the desired effect, but in many cases they were designed not for packaging, but for the comfort and protection of the individual, or to produce a desired mechanical effect in an item (i.e. shock absorbers for an automobile and cushions for furniture.) Currently being studied for packaging is the material used to cover boxing rings to protect boxers from head injuries. The same material is being tested for use in place of felt pads in air drop kits for the military. To briefly analyze the material, it can be easily deformed under shock load and is very slow in regaining its original shape.

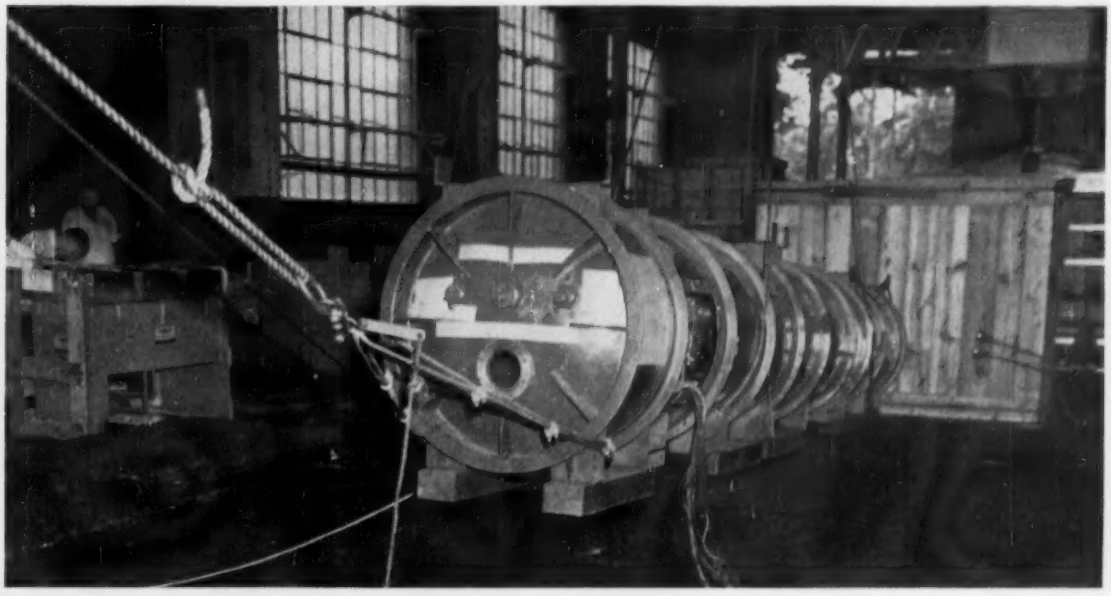
Test Methods

For means of comparison of packages, test methods which were calculated to reproduce the hazards encountered in the field were developed. A few such tests are based on the following premises:

1. A one-man load will be dropped from a height of 30 inches.
2. A heavier item being carried by two men is placed down by lowering one end and dropping the other. Average height of drop is dependent upon the load and may vary from six to 36 inches.
3. Delivery of a package from a truck or railcar to the ground without the aid of handling equipment involves a drop averaging 42 inches.
4. In the absence of mechanical handling, a heavy or bulky package will be tumbled; thus a roll-over test is required.

It can be seen that these tests were calculated to simulate the actual field conditions as far as handling is concerned. The tests for simulation of transportation hazards are not so readily reproduced. It is possible to simulate the coupling of freight cars by incline-impact and crane swing tests, however.

The reason for lack of test criteria on transport conditions is very clear in that shocks and vibrations vary within each transportation medium, such as the constant variation of road bed conditions, or atmospheric conditions in air and sea transportation. We feel that



INSTRUMENTED IMPACT TEST utilizing crane swing method can be used for large units in place of the usual incline-impact test. Acceleration measurements are made at several points on the packaged item to determine the efficiency of the shock mounting system. In addition to recording force of impact in g's, instruments include a measure and record of the time duration of the impact as it is being experienced.

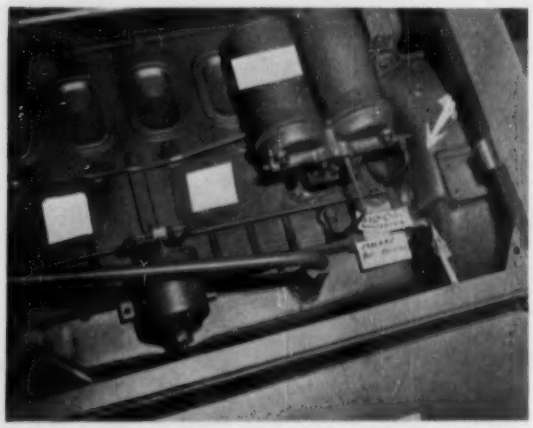
Continued

to date there is not enough reliable data available to establish the average magnitudes of shocks and vibrations in common carriers and that only comparative tests can prove a design.

Instrumented testing does provide one decided advantage over comparative testing . . . that is the removal of human error. Observed damage caused by a variety of phenomena may cause disagreement between observers. By instrumentation, the damaging phenomena are recorded and are available for scientific analysis. If instrumentation is to be used, it is necessary to assume that the range of frequencies and magnitudes of shocks and vibrations to which an item may be submitted lies within the limits of this recorded data.

In proving and developing designs, certain assumptions must be made based on theoretical calculations and intrinsic knowledge. Therefore, in order to discuss shock and vibration in engineering terms, it is necessary to develop basic assumptions concerning the types of damage resulting from them and to place the forces involved in their proper categories.

SHOCK AND VIBRATION are responsible for this damage to drums containing granular material. Shock has broken bulkheads and vibration has loosened lids.



IMPACT TEST simulating rail car humping resulted in failure of generator bell housing. U. S. Army Photos.

Shock

Let it be assumed that a shock is an impulse load and that the damaging result of vibration is fatigue. Damage is the result of work and work involves energy. In the case of shocks and vibrations, it is found that Newton's second law of motion provides an introduction to the damaging forces and therby to energy. In applying the law, it can be seen that the forces exerted on a body are directly proportional to the acceleration, $F = Ma$.

In shocks and vibrations, the accelerations are continuously variable and thereby the force at any instant is mathematically stated $F = M\ dv/dt$ or $fdt = mdv$ which is equivalent to $\int Fdt$—MV, the latter being the basic equation for impulse and momentum. From these facts it is assumed that the best shock parameter to measure is impulse. It then follows that the fragility of a given item must not be given merely in g's, but must include a measure of the time duration of the impact. This may be recorded by using accelerometers and recording accelerations on a time base.

With this recorded accelerations-time curve from an item, a triple check can be made on the energy imparted to the item through the impressed shock. First, kinetic energy KE equals $\frac{1}{2}$ MV^2. Secondly, the energy imparted by the impact is $\frac{1}{2}$ JV, where J equals the impulse. Thirdly, the energy possessed by the item equals the area under the dynamic load curve. For a given shock the energy calculated in each one should be equal. In any real case a slight variation is to be expected, caused by error between experimental techniques and mathematical assumptions. The recording of accelerations should be carefully studied so that the information gathered may be reduced to resultant force vectors for in many cases no answer can be derived unless the direction and magnitude of the impulse is known.

One of the simplest methods for insuring calculable results is to place the accelerometers so that they will record accelerations along the three major axes. With acceleration-time curves developed along the major axes, the resultant can be calculated. It will be noted that no torsional motion has been considered in this assumption.

Vibration

Consider now the vibration which will induce fatigue. The vibrations encountered in common carriers are not of isolated frequencies and amplitudes but of several frequencies and amplitudes, one superimposed

on the other. Until a more exacting study of these factors has been completed, it is best to proceed on what is known.

Basically, it may be assumed that the most damaging frequency to any item is its resonant frequency wherein a small repeated force may induce deflections producing fatigue failures. Therefore, the fatigue characteristics of the materials used in a vibration or shock isolator should be studied with respect to the frequencies involved for protection of both the isolator and the item. Frequencies encountered in common carriers range from one to 200 cps.

To introduce concepts of shock and vibration isolation systems, consideration of three factors is important to the decision of how to produce the best result:

1. *What is known and what is essential regarding shock and vibration isolation?*

   The physical properties of available materials are either known or can be determined. The characteristics of the isolated item are known or can be established and the basic physics of shock and vibration are known.

2. *What variables are involved and which can be taken into consideration?*

   Natural variables such as temperature humidity and pressure can be determined and, if necessary, controlled. Useful variable parameters of shock and vibration include amplitude, frequency, acceleration and velocity. The useful variable characteristics of the isolation systems may be stated in terms of amplification, transmissibility and load curves. The container is a part of the isolation system. The variables which are most erratic are those containing the human element. This cannot be calculated . . . only predicted.

3. *What controls the economics of packaging for a given problem?*

In order that shock and vibration isolation designs may be evaluated, some ideal or standard de-

(Continued on page 154)

in this ONE PLANT

Generalift Pallet Boxes save $15,000 a year!

It once took five men—just to store and ship automotive components produced by Excelwel Manufacturing Company of Detroit. Now two men handle the job—easily—with Generalift Pallet Boxes. That's only *one* aspect of the many savings brought about in *one* year, in *one plant*—with Generalift. Excelwel's plant superintendent estimates these savings at $15,000 a year.

Here are 4 ways Generalift Pallet Boxes can ease *your* handling and shipping problems:

1. **They arrive "flat" for easy storage.**
2. **They're palletized for easy fork lift handling.**
3. **They're light—but extra sturdy. They carry a payload of well over a ton—safely and easily.**
4. **They stack three and four high—fully loaded—save valuable warehouse space.**

Write today for full details. Find out how Generalift can help solve your handling, storage and shipping problems—at a saving.

Engineered Containers for every shipping need

Factories: Cincinnati; Denville, N. J.; East St. Louis; Detroit; Kansas City; Louisville; Milwaukee; Prescott, Ark.; Sheboygan; Winchendon, Mass.; General Box Company of Mississippi, Meridian, Miss.; Continental Box Company, Inc., Houston.

General Box

GENERAL BOX COMPANY, 1857 MINER STREET, DES PLAINES, ILL.

★ ★ ★ ★ ★

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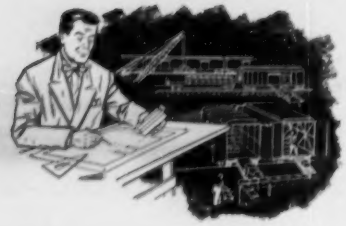
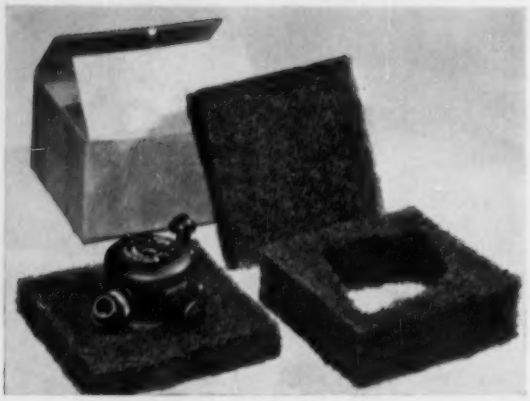


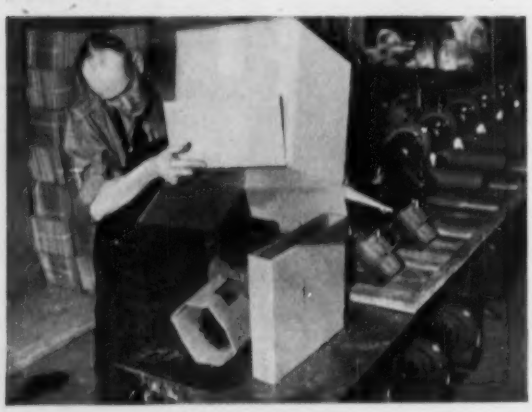
Proven Methods for

Protecting



RUBBERIZED CURLED HAIR is used for packaging Bendix Oxygen Regulator. The unit is first placed on a pad of cushioning . . . a die-cut pad is then placed over and around the regulator . . . finally, a third pad is placed on top and rectangular unit which results fits snugly into corrugated carton. The method provides support on all sides of the regulator, floating it safely away from all shocks and vibrations which are certain to occur in handling and shipping.

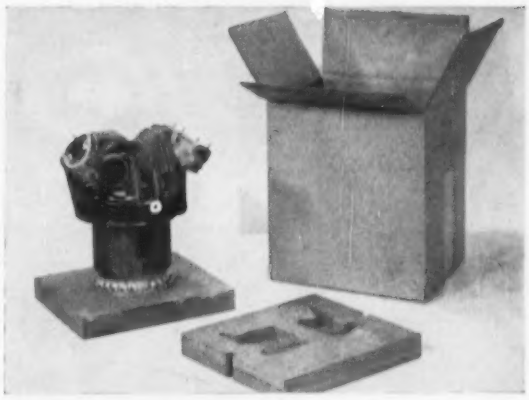
HAND STAPLER provides a speedy, efficient method for making closures which are secure and not affected by extreme temperatures and humidities. In addition to helping corrugated containers to withstand forces of vibration and shock, staples combat pilferage because it is not possible to remove and replace them without it becoming quickly apparent. Stapled closure does not interfere with printed matter on containers.



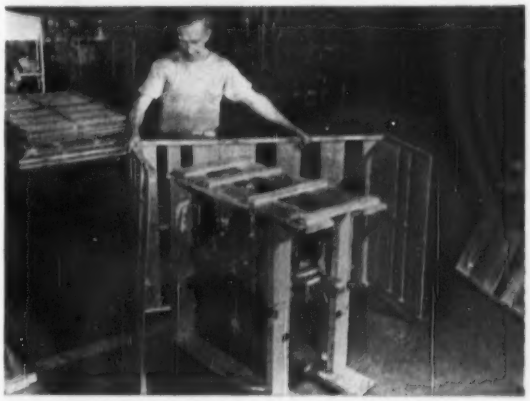
CORRUGATED BOX with die-cut inserts protects oil burner from shock and vibration and also seals out dust and moisture. As burners come off assembly line at Eckhart Mfg. Co., Inc., the die cut sheets are placed around the unit, a corrugated shell is slipped on and then sealed to complete the simple packaging operation. This has proven completely satisfactory for shipping burners anywhere in the country by truck or by rail.

Against Shock and Vibration

CANE FIBERBOARD can be prefabricated to fit product contours and carton sizes and to pad, position, cushion brace and lock items in containers. Wright Aeronautical Division of Curtiss-Wright Corp., uses the cushioning material in corrugated containers for domestic shipment of aircraft engine cylinders and in re-usable steel drums for overseas shipments. Only two minutes are required with this method to package cylinders which weigh 62, 70, or 78 pounds.



WIREBOUND CRATE has special interior braces to protect oil-filled electrical reclosures with fragile porcelain bushings. Unit is bolted to interior braces which have been nailed to both top and base of the crate. Sides of the crate are made up of a one-piece wrap-around blank. Open construction of the crate reduces weight and also helps to insure against damages from mishandling (carrying package upside down).



STEEL STRAPPING helps to protect against shock and vibration in several ways: (1) It makes a solid unit of item or items, eliminating possibility of shifting; (2) When used on an individual carton or container strapping dampens shocks . . . when an item is dropped shock of impact travels to first strap and is smothered rather than traveling through entire package. Thus, proper placement of strap is important.

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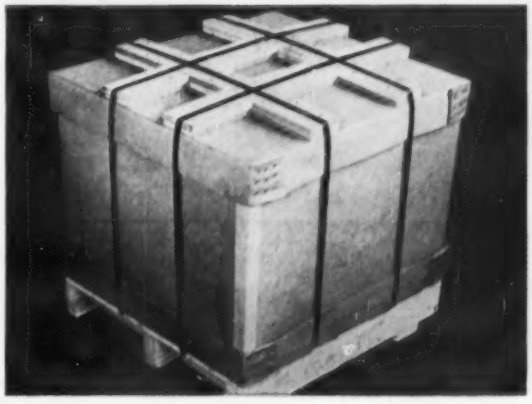
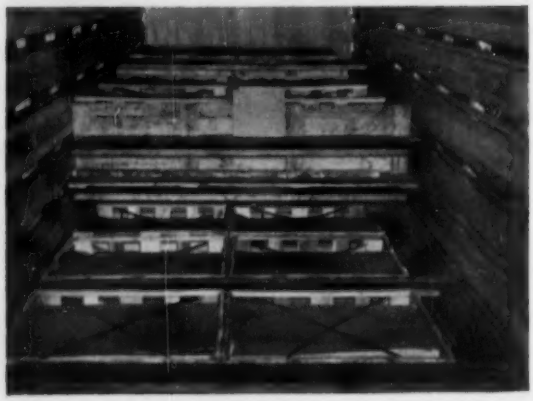


FILAMENT TAPE can be used for unitizing a load of bags in doorway area of boxcar. Only a few bands of tape are required around the load to prevent the bags from shifting against the door or bulkheads during rough handling in transit. In photo at left, tape has been cut off at proper length and inserted under second bag from bottom. Wedge is used to trowel tape into position and to insure good bond.

FURNITURE BLANKET, consisting of two sheets of kraft paper whose inside surfaces are coated with layer of asphalt, protects almost any item which can be harmed by vibration, shock or moisture. Between coated sheets is a thick layer of compressed discerpt paper batt. As bits of paper are disturbed by handling and usage, their fibers fold and curl and pad becomes more resilient. Asphalt protects against moisture.



SPECIALLY EQUIPPED CAR provides protection against rough transit for crated appliances. Each appliance is held securely in place by cross members which engage into perforated tracks along car walls. Note steel straps criss-crossed over each appliance to add rigidity and protect finish. To take advantage of all space a second tier is built from rear forward.

Photos courtesy of: Armour & Company; Curled Hair Division; Bostitch; Celotex Corporation; Evans Products Company; A. J. Gerrard & Company; Hinde & Dauch Paper Company; Jiffy Manufacturing Company; Minnesota Mining & Manufacturing Company; Wirebound Box Manufacturers' Association.

STEEL STRAPPING ⬆ ⬆ STRAPPING TAPE

Use Brainard's complete service!

...STEEL STRAPPING AND STRAPPING TAPE

BOB WHITAKER . . . SALESMAN—BRAINARD'S CLEVELAND OFFICE.

TRAINED Brainard salesmen, like Bob Whitaker of Cleveland, know after their job analysis whether steel strapping—or strapping tape—is called for . . . are then prepared to recommend and demonstrate whichever method is best for you.

In lumber yards, for example, there is a need for both methods. For banding the large unit load of rough lumber shown above, Bob Whitaker recommended Brainard heavy duty 1¼" steel strapping. Results: savings in time and labor in handling and delivery for both yard and contractor. For bundling orders of finished material, like molding, into snug packages, Brainard strapping tape was the choice, because it can easily be applied in no time at all —leaves no nicks or dents in the wood!

Why not ask for a Brainard strapping analysis, and determine if you can make substantial savings in your packaging and shipping costs. For information write Brainard Steel Division, Dept. K-10, Griswold Street, Warren, Ohio.

Brainard

SHARON STEEL

STEEL DIVISION
SHARON STEEL CORPORATION

COMPLETE STRAPPING SYSTEMS & MATERIALS • WELDED STEEL TUBING • ELECTRO-GALVANIZED STRIP STEEL • SCAFFOLDING • RACKS • BUILDING PRODUCTS

Offices in principal cities throughout the U.S.

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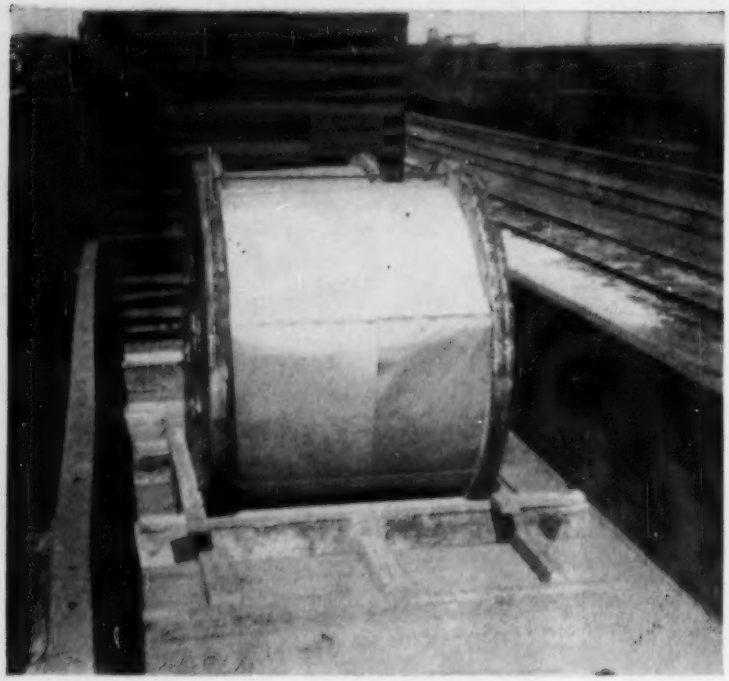

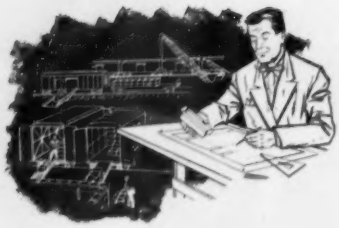

WATERPROOF PAPER, reinforced with fibers, is used to protect cable on reels from moisture damage during shipment in open gondola cars.

Weapons for . . .

The Battle Against Moisture

MOISTURE, in vapor and liquid form, presents some of the greatest problems confronting the packaging engineer. Much has been done of course in the fight to prevent deterioration of metal products, contamination of necessarily pure materials (food, chemicals, etc.) and damaging absorption of moisture by hygroscopic materials during handling, storage and shipment.

Moisture damage is a problem which is by no means peculiar to overseas shipments only . . . or even to only long-distance movement of materials. Packaged products can become victims of unfavorable atmospheric conditions during extremely short trips, while they sit on the shipping dock, or even while on the shelf in an enclosed warehouse.

For protection against moisture during handling and shipping the packaging engineer can find help in any of a variety of preservatives, flexible barriers (protective wraps, etc.) plastic coatings, rust inhibitors, dessicants, etc.

Basically, there are only three types of flexible barriers: (1) those which are waterproof and which protect against rain during outdoor storage and transportation, road spray in open vehicles and similar conditions; (2) those which are moisture-vapor proof and which when sealed tight provide a block against the infiltration of even the slightest amounts of moisture; (3) those which are used primarily as retainers for preservative oils or greases that may have been used to coat metal parts.

Moisture Vapor Proof Barriers

The essential ingredient in moisture vapor proof barriers is usually a sheet of aluminum foil, which even in the thickness of 1/1000 inch has a water vapor transmission so low as to be difficult to measure. By itself, however, aluminum foil is difficult to fabricate into sealed containers and is subject to pin-holing as soon as it is folded, flexed or creased.

Plastic film, bonded to one surface of foil provides a seal over the pin-holes which are bound to occur during sealing operations, etc. In addition to plastic films, cloth or paper is usually laminated to the foil to provide adequate physical strength.

Waterproof Flexible Barrier Materials

Waterproof Barriers are ordinarily used as liners

"Enough to make the difference..."

NOW!

ORANGE CORE

the world's largest-selling gummed tape...world's only standard tape with the

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Seal of Quality

Now, don't guess which is the best tape—Orange Core has just been awarded the coveted Seal of Quality by the world-famous U. S. Testing Co.—the only standard tape to receive this famous Seal.

Orange Core users won't be surprised at this honor. They've discovered the consistent superiority of Supple-ized® Orange Core—enough to make the difference in time, labor and money—superiority that makes Orange Core the world's largest-selling tape!

Only Hudson's "pines to paper" integrated control makes possible this superior tape at regular prices. Prove to yourself that Orange Core really offers "enough to make the difference". Make your next order Orange Core! Look for the Seal of Quality on every carton!

Only one standard tape received this famous Seal! The U. S. Testing Co. purchased all tapes on the open market, subjected them to exhaustive month-long testing at their Hoboken, N. J. laboratories. Yet of all tapes tested, only *one* standard tape received the Seal of Quality—Supple-ized® Orange Core, the world's largest-selling tape.

ANOTHER SUPERIOR PRODUCT BY Hudson

Orange Core Gummed Tape is another Hudson Quality Product...a member of the renowned family of Hudson Paper Napkins, Tissues, Towels, Blue Ribbon Super-Standard Gummed Tape, Kraft Wrapping Paper, Grocery and Heavy Duty Bags, Multiwall Sacks and Laminated Wrapping Papers.

Standard Tape • Super Standard Tape • Napkins • Kraft Wrapping • Grocery Bags • Multiwall Sacks

P.S.

It's easy to prove to yourself the superiority of Orange Core. Send for free trial roll plus booklet, *"This clipping will help you clip your costs!"*

WRITE TO **HUDSON PULP & PAPER CORP.**
Dept. F-10. 477 Madison Avenue, New York 22, N. Y.

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for boxes and crates of all types, crate top covers, temporary tarpaulins, etc. Their primary function is to keep out liquid water such as rain or road spray, but not necessarily to hold out water vapor which might be in the atmosphere.

Construction is usually of layers of kraft paper laminated with a layer of asphalt compound or polyethylene. In use, the material may be glued, taped or stapled in place depending upon requirments brought about by specific applications.

Grease-Proof Barriers

When preservative oils or greases are used to protect metal products from moisture it is usually necessary that some type of grease-proof barrier be used as a retainer.

The basic raw materials which are usually used to obtain a grease-proof barrier are:

1. A highly hydrated paper stock such as glassine or greaseproof.
2. A plastic film such as cellulose acetate which can be laminated to paper.
3. Plastics which can be coated on paper such as polyethylene, vinyl compounds, polyvinyl alcohol and various cellulose derivatives.
4. Aluminum foil which may be laminated to paper.

Additional materials used in the manufacture of greaseproof barriers include neutral paper stock, cloth scrim (for strength) and microcrystalline wax (to provide moldability.)

Plastic Coatings

In the last few years much has been done in the development of the plastic coating as a tool for the packaging engineer. Coatings come in two general types; dip and spray-on coatings.

Dip Coatings—These are generally applied at high temperatures (from 300 degrees F to 375 degrees) under thermostatic control in special tanks designed to provide indirect, uniform heating. As the coating on a dipped part cools it contracts to form a skin-tight protective covering on the metal. For removal, the plastic is slit and peeled off like the skin of a banana.

Proper dipping equipment is vitally important to successful use of hot-dip plastic coatings. In fact, during the early development period of that packaging method, progress was delayed due to a lack of properly designed equipment for the critical and difficult melting and heating required by the compounds. Now, however, both the plastics and the heating equip-

BENCH-TYPE TANK is for dipping small quantities of small tools and parts in plastic dip coatings. Items are afforded protection against humidity and abrasion by coatings.

CONVEYORIZED DIPPING OPERATION is installed at Food Machinery Corp. for plastic dipping of hand tools. This arrangement permits high volume operations.

Continued

ment have been perfected so that it is possible to obtain units in sizes ranging from large tanks needed for mass production down to small portable models for lower volumes.

When dip coatings first appeared, they used ethylcellulose as a base. They were dark brown or purple in color and were applied at 375 degrees F with little or no variation in application temperature permissible. Since that time, however, manufacturers of that type of compound have succeeded in producing translucent and, in some cases, relatively transparent coverings that are applied in the 350F to 365F range.

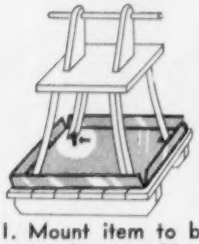
There has developed, however, another family of plastic coatings using cellulose acetate butyrate as the base. These, while considerably higher in price have claimed to provide several advantages that have resulted in widespread usage, particularly in post-war operations. It is said, for instance, that a thinner coating will suffice for protection, counteracting the high original price of the material.

The continuing research in plastic coatings has led to the development of dyes which give rich colors to coatings without disturbing transparency. This has led to some interesting developments in color identification of units. One motor manufacturer now pack-

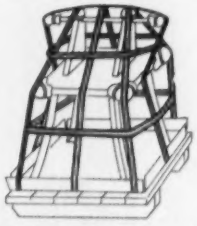
ALUMINUM FOIL is essential ingredient of moisture vapor proof barriers. Due to pinholing tendency during packaging operations, aluminum is laminated to polyethylene film. Sometimes, cloth or paper is laminated to barrier for added physical strength.

GOOD CLOSURE is important for adequate protection against moisture. Here, water-activated paper tape is used by pretzel maker to close shipping boxes. Automatic dispenser assures good seal every time.

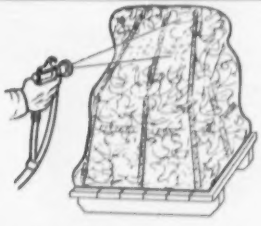
STEPS IN APPLICATION OF COCOON PACKAGE



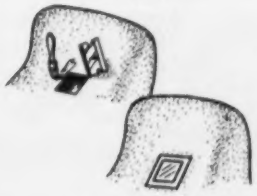
1. Mount item to be packaged on metal base which has been placed on a pallet. Seal all holes in base.



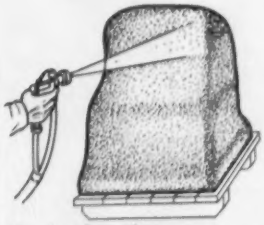
2. Pad all sharp or protruding surfaces . . . apply network of 1/2 or 1-inch pressure sensitive tape.



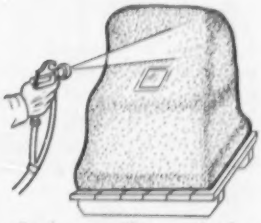
3. Apply webbing coat, holding gun 2' from surface. (Fibers bridge 20" gaps.) Apply 2nd coat.



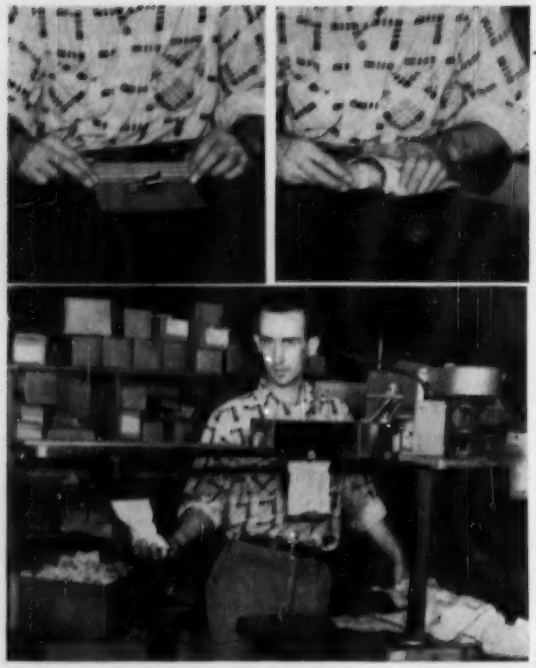
4. Install 6 x 6-inch plexiglas window on 4 x 4-inch opening cut into cocoon. Adhere with tape.



5. Apply subsequent coats to reach desired thickness. Cut ventilator holes and install humidity indicator.



6. Seal ventilator holes, overspray all patches and remove masking tape from window.



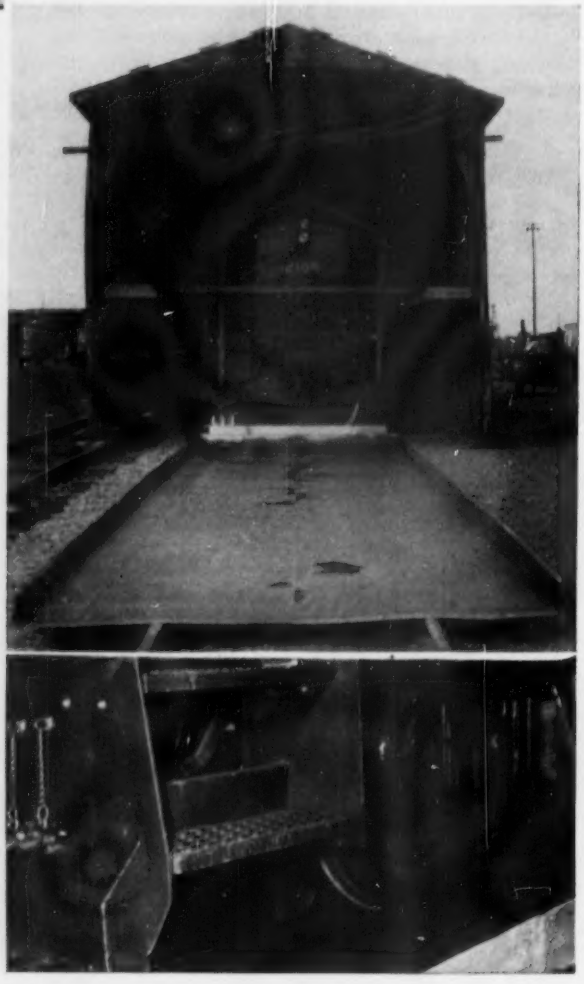
A TWO-INCH STEEL DRIVE . . .

Photo sequence, above, illustrates a method currently being used for protecting steel drives during shipment. First, the drive is wrapped in a grease-proof, acid free, non-corrosive corrugated board. Then it is placed in a waterproof, vapor-proof bag along with dessicant. The bag is sealed and put in corrugated box for shipment.

ages spare parts for each of his standard motor models in a different color plastic coating. Not only are his parts fully protected against rust and abrasion, but identification is simplified.

Spray-on coatings—These are sometimes referred to as cocoon coatings and are usually made of vinyl type materials which can be sprayed in a similar fashion to paint. Some of them can also be applied by dipping. When sprayed the material drys in less than 60 seconds and cures in 24 to 72 hours depending upon humidity conditions.

Two basic types of spray-on coatings are available; strippable and non-strippable. The strippable material can be applied directly to the surface to be protected and is recommended for use when protection of a few hours to a maximum of 90-days is required. The material has been used effectively on motors, pumps



. . . A DIESEL LOCOMOTIVE

Moisture can cause extensive damage to locomotives too. Therefore, when they are temporarily removed from service they must be completely protected from humidity. One method of doing the job is pictured at right. First, a steel plate is placed across the track. Locomotive is rolled onto the plate, depressing it (but not cutting it) to provide a bottom seal. A wood and cloth strip framework is built around the unit and it is sprayed with "cocoon" coating. All moisture is evacuated from the structure before final seal is made.

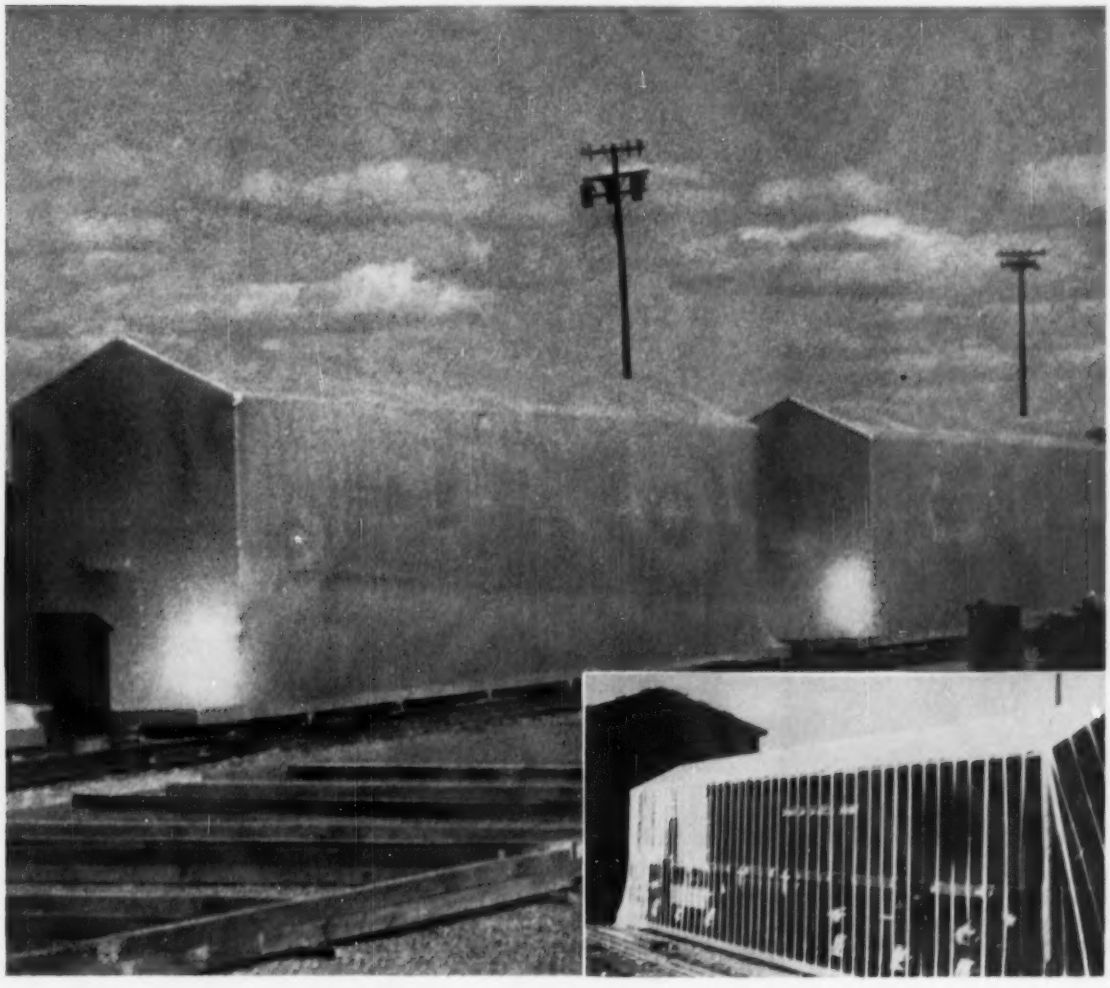
and other odd-shaped pieces which are ordinarily difficult to package. As the 'cocoon is sprayed on it conforms to the shape of the product being packaged. For removal, strippable coatings can be taken off with a less than one-pound per square inch pull.

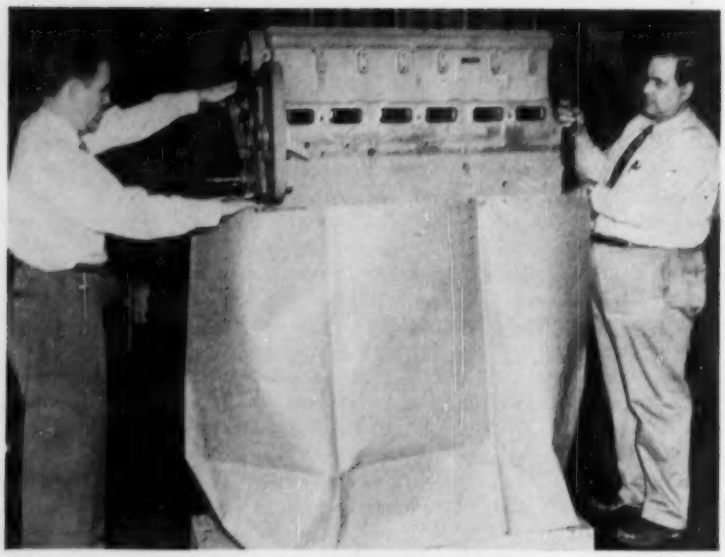
Non-strippable spray-coatings, on the other hand, require a pull of seven, eight, 10 or more pounds per sq. inch for removal. There are other grades or types of coatings which have intermediate adhesion characteristics. Also affecting the permanence of a coating is the technique of application.

One of the most interesting developments in spray-on vinyl plastics stems from the material's ability to jump a gap while it is being applied. A framework of chicken wire, cloth strips or tape is built up around the item to be enclosed. Then, as the coating is sprayed on it builds up a netting to cover the openings in the framework. Materials vary in their ability to jump gaps from one to 18 inches, depending upon their compositions.

If a "cocooned" unit is to be stored outdoors, it may be necessary to build up a coating with extra thickness. (Exact thickness depends upon the length of time which is expected for outdoor storage.) The plastic materials contain colored dyes to enable an applicator to better determine the thickness of succeeding coats which he must apply to reach the proper thickness. An experienced applicator can guess within one or two mils the exact thickness of each coat as he sprays it on.

Spray-on coatings have been put to use by the railroad industry recently to help solve a gigantic packaging-for-storage problem. As in most any industry, railroads have peak periods, during which all





ENGINE HEAD for diesel engine is protected against rust in oblong bags made of vapor-proof barrier which has been treated with volatile Corrosion Inhibitor. Three engine heads are placed in each bag, with wooden separators. Bag is folded over and cemented to accomplish a waterproof seal. This method has cut handling and packaging costs, resulted in cleaner package.

The Battle Against Moisture

Continued

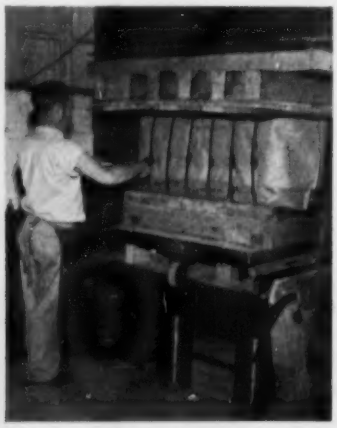
equipment is in use, and slack periods when they have a great surplus of power. (i.e.—in farm areas where transportation facilities must be able to meet demands at harvest time but are on stand-by the remainder of the year).

In the past it has required up to two weeks to put a locomotive into storage and about the same amount of time to put it back into service. This is so costly and time consuming that many railroads have found it better to keep equipment running. Although such stand-by operation does help prevent rust, it costs about 20 cents per mile.

Now, when a locomotive is not to be used for a long period of time, it can be enclosed in a "cocoon" made of spray-on plastic. The only preparations required are: (1) drain the radiator, (2) take the stuffing out of packing boxes and put corrosion inhibitors in them; (3) drain the fuel tank; (4) drain the oil.

The locomotive is driven onto a steel plate which has been laid across the track—this seals the bottom and a frame-work of wood and cloth strips is built around it. The enclosure material is sprayed on and the job is complete.

(Continued on page 169)



BALE CAP, made of waterproof laminated material prevents soiling and scuffing of textiles during shipment. LEFT, lower portion is opened and filled with print goods. Upper portion of cap is then placed over it. MIDDLE; bale remains on special platform truck as it is put into baling press to be bound with steel strapping. RIGHT, after bale has been compressed and strapped and is ready for shipment, platform truck is merely wheeled out of the baling press to the shipping docks.

GAIR can help MEET YOUR DEADLINES

with assured delivery service

It's not hard to get a promise of shipping container delivery. But often there are a number of "ifs" in that promise. "Ifs" that don't exist at Gair.

"If our supply of raw materials permits, we'll be able to deliver on schedule" is one of the "ifs" you won't find at Gair. Our raw materials are grown in our own forests, processed in our own plants. We don't run short.

"If our manufacturing schedule holds up" is another qualification you won't hear from Gair. We have *eleven plants*, equipped to fabricate whatever quantities and types of corrugated or solid fibre shipping containers you need:

"If local transportation facilities stay on schedule" is a third worry you don't have with Gair. Gair trucks provide a neighborhood service from strategically located plants.

Check your nearest Gair plant for the complete story on Gair-designed shipping containers to meet your specific needs. SC.4.2

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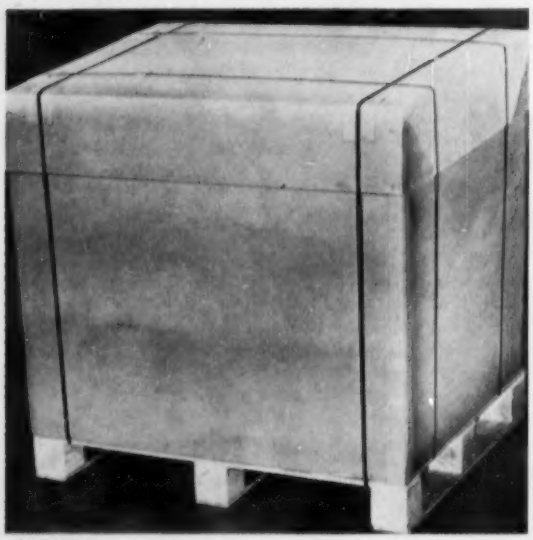
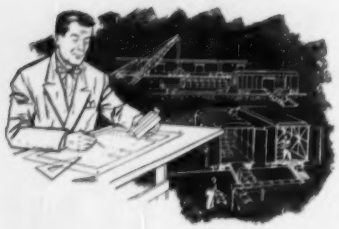
PILFERAGE . . .

FIRE EXTINGUISHER is exported in wirebound crate, practically ready for action. Attachments that might be pilferable are packed in small container which is steel strapped to the extinguisher. Even if straps could be cut, small box is too large to be removed through the openings of the wirebound crate.



SIFTING

1000 POUNDS of "Styron" plastic pellets are shipped in corrugated fibre containers with no danger of sifting. Box consists of inner body; bottom lid into which inner body slips; outer body which telescopes over bottom lid and inner body; top lid which fits over outer body. Steel strapping in two directions seals box and attaches it to expandable wooden pallet.



Product Loss=

A PACKAGING engineer's job is by no means complete when he has designed a package which will protect the product aginst shock, vibration, moisture or other conditions which are apt to cause physical damage. In addition to designing a package which will keep the product in good condition until it reaches its destination, the packaging engineer must also provide a package which will insure that the destination *is* reached.

Misdirected shipments, dusting of powdered materials, leaking of liquids and even pilferage can be substantially reduced by intelligent package engineering. The importance of reductions in such types of loss is vitally important, for product loss is really profit loss and no business can expect to operate at highest possible profit if a portion of its finished product (profits) is lost before it reaches the purchaser.

Misdirected Shipments

It has been estimated that misdirected shipments account for about 10% of the total claims filed against common carriers. For the past several years American Trucking Association estimates of loss and damage bills attributed to faulty identification (or no identification at all) have exceeded $10 million. Losses of this nature are considerably more serious than others heretofore discussed because the entire shipment rather than only a part of it is lost or damaged.

Carriers seldom fail to make good on claims resulting from lost shipments. This on the surface, appears to make such losses of little real seriousness as far as the shipper's pocketbook is concerned. Actually, however, they are paid for by the shipper in the form of higher insurance premiums and higher freight rates.

The primary solution to the costly problem of lost shipments is a simple one, and a responsibility of the packager. Care in marking of information like addresses, identification codes and directions for handling will speed handling, make handling safer and, of course, help insure that shipments get where they are supposed to go. The packaging engineer might do well to look into the possibility of code-dating packages, particularly if his products are of a per-

Profit Loss

ishable nature. This is a great aid to spoilage prevention, helping to insure that first-in is always first-out of storage areas.

Dusting of Powdered Materials

When packaged improperly, powdered materials are likely to leave a trail of wasted profits from the shipper's plant all the way to the purchaser. Such loss starts at the packaging line and continues every time the package is handled . . . into and out of storage, into shipping vehicles, in transit, onto the receiver's dock and even into his plant.

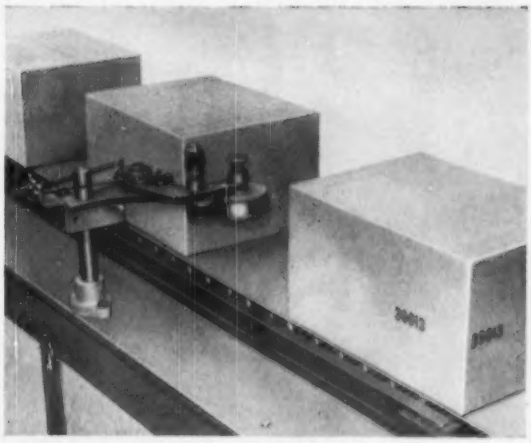
Ready to help the packaging engineer with this problem are special containers and container liners incorporating dust-proof closure methods.

Dow Chemical Co. of Midland Michigan recently standardized on a corrugated fibre container for shipment of its "Styron" plastic pellets. The container measures 41¼ by 32¾ by 33 inches and permits handling of 1000 pounds in a single operation. It consists of four parts: the inner body; the bottom lid into which the inner body slips; the outer body which telescopes over the bottom lid and the inner body; the top lid which fits over the outer body.

Both the inner and outer bodies are made of 700-pound test, double-wall board taped with three-inch, super-heavy, clay-filled cloth tape. Both lids are made of scuff-resistant, moisture-resistant 500-pound test, single-wall board. The lids are cut, scored and prestitched so that they may be shipped to Dow flat and ready for immediate assembly. When the box is filled and capped, it is steel strapped in two directions to an expendable wood skid. Downward and outward pressure of the plastic pellets prevents sifting at the bottom.

Since adopting the new container, Dow has had no trouble with loss of product due to sifting during handling, or shipping. Furthermore, the box is palletized prior to filling, permitting fork truck handling after filling. This method handles 1000 pounds of pellets at a time (five times more than was possible before.)

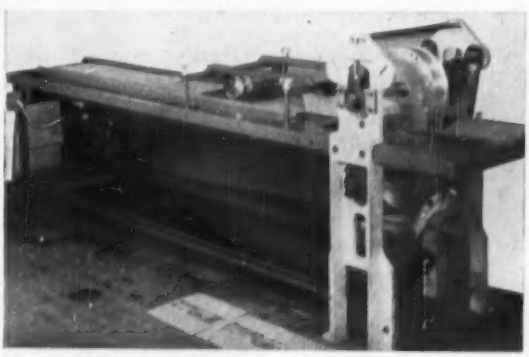
(Continued on page 158)



MISDIRECTED SHIPMENTS

PROPER MARKING of individual units or of entire shipments will help to prevent lost materials. Unit above marks two sides of a shipping case at one time as it moves to storage or shipping.

HAND STAMP STENCIL DUPLICATOR makes certain that all packages in a shipment are correctly marked, reducing possibility of misdirected shipments.



COMBINATION PRINTER AND FOLDER is for use with corrugated containers in high volume operations. In addition to advertising message, printing machine can print handling instructions, identification and other information which will aid product protection.

Babying Your Products is the Special Talent of Gaylord Boxes

Gaylord Boxes cradle your product in *safety* from packing line to the end of the trip.

This positive protection is a natural result of Gaylord's specialized approach to container engineering. Successful experience and tireless ingenuity combine to produce quality boxes that are exactly suited to your particular packing needs.

Many of America's leading manufacturers have learned to depend on Gaylord Boxes. How about you? For information and cooperation, phone your nearby Gaylord office. It's listed in your phone book.

Gaylord Container Corporation

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Corrugated and Solid Fibre Boxes • Kraft Paper and Specialties • Kraft Bags and Sacks • Folding Cartons

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SHOCK . . .

(*Continued from page* 139)

sign must be described. It is conceivable that a design could be theorized which would prevent any energy impressed on the container from being seen in any form by the contained item. Thus the efficiency of the system would be 100%, and can be expressed by the following mathematical formula:

$$\text{Efficiency} = \frac{U_1 - U_2}{U_1} = C$$

. . . Where U_1 is the energy load impressed on the container and U_2 is the energy load impressed on the contained item.

It can be seen that this goal is ideal and can only be approached by an actual system. Using currently available materials and techniques an isolator temporarily stores the energy and releases it over a longer time interval with some dissipation in the form of heat.

In order to design toward the ideal goal, the shock isolator should be soft and capable of being displaced to reasonably large amplitudes. A one shot or peak threshold shock absorber can be designed to protect the contained item from one destructive shock if failure occurs at a given deflection, dissipating large amounts of the impressed energy. Vibration isolators may or may not be "soft" depending upon the frequencies being isolated against. If the frequencies are high, then the shock isolator is also a good vibration isolator. If the frequencies are low, however, a stiffer material must be used to provide the necessary isolation.

A study of the energy absorbing abilities of shock isolators versus isolators will point out that a good shock isolator will absorb a large amount of energy rapidly and release it slowly, whereas a good vibration isolator will absorb only a small amount of energy and will release it at a slightly slower rate, thereby effectively protecting the item against frequencies which would be damaging to it or its components. Caution should be taken to insure that the natural frequency of the

BOSTITCH STAPLES SPEED FASTENING *of TWA air freight bills*

Trans World Airlines overlook no detail in making sure that their air freight shipments arrive safely and swiftly.

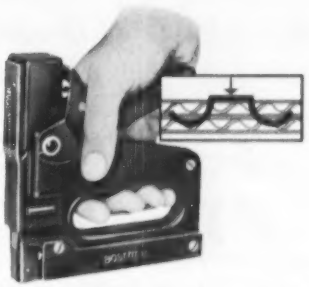
An air freight bill is attached to every carton and for this they now use a new kind of tacker originated and developed by Bostitch. It is the T5-8 with outward clinch which drives staples that "spread-eagle" inside the carton wall instead of going through. The staples hold the freight bills securely, yet do not touch the contents of the carton.

TWA formerly used masking tape for this job, but found stapling much faster, and with great resistance to moisture and rough handling.

Now every station in the world-wide TWA chain is equipped with the Bostitch T5-8 Tacker with the new outward clinch.

Shippers by the thousands report more secure fastening and sharp cost reductions when they switch to Bostitch staplers and staples. There are over 800 kinds of cost-cutting Bostitch staplers available. How much can you save? Your nearest Bostitch Economy Man will be glad to help you find out.

Look up "Bostitch" in your telephone directory or fill in the coupon.



Bostitch T5-8 O.C. Tacker. *It's a self-clinching tacker. No blade insert. Staples spread themselves inside or under the work. Two models, for light and medium staples. Your Bostitch Economy Man is ready to demonstrate the T5-8 O.C. Tacker for you.*

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- ☐ Send free bulletin on the new T5-8 O. C. Tacker.
- ☐ Send detailed information on shipping room applications.
- ☐ Send around an Economy Man to analyze our fastening methods.

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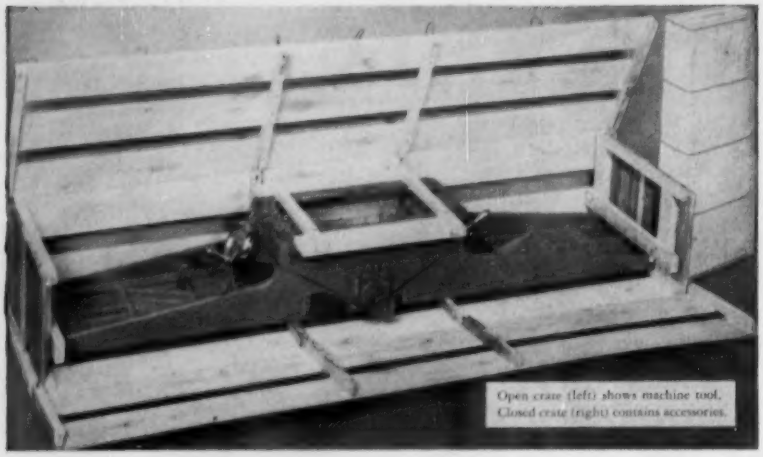
SAVE DAMAGE, WEIGHT and COSTS $$$



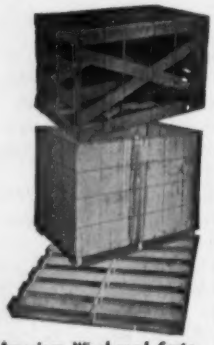
Open crate (left) shows machine tool. Closed crate (right) contains accessories.

American "Wirebounds" Ship Machinery Safer for Less

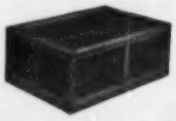
2 Crates are Lighter, Cheaper than One

Problem: Excessive Shipping Damage! This machine tool with accessories, formerly packed in **one** wirebound crate. Heavy, expensive, vulnerable if dropped.

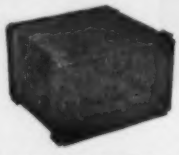
Answer: **Two, new American Wirebound Crates!** One for the tool, the other for accessories. Individually designed, "Pressure-Packed," they eliminated cause of damage, **saved 21 lbs. weight, cut crate costs $2 per unit and lowered shipping expense as well!** Are your containers American-made? If not, get in touch with us today! **You, too, will save damage, weight and costs!** Send your product for a "Sample" packing and "quote"—no cost, no obligation.



American Wirebound Crate, Tote Box, Pallet



American Fibreboard Box



American Nailed Wood Box

★Thousands of acres of timber, three veneer mills, two great plants in Cleveland, Ohio, and Marion, S. C.

THE *American* BOX CO.

1909 W. 3rd Street, Cleveland 13, Ohio — Phone: SU 1-4900 — Marion, South Carolina

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isolator does not coincide with the natural frequency of the isolated item.

Isolation systems using combination shock and vibration isolators may be required. In this case, the vibration system bottoms at a critical amplitude against a shock insulator. Thus, the vibration isolator effectively protects the contents from vibrations significantly away from the natural frequency of the system, and the shock isolator protects the contents against severe shocks encountered when the vibration isolator bottoms.

What You Must Know

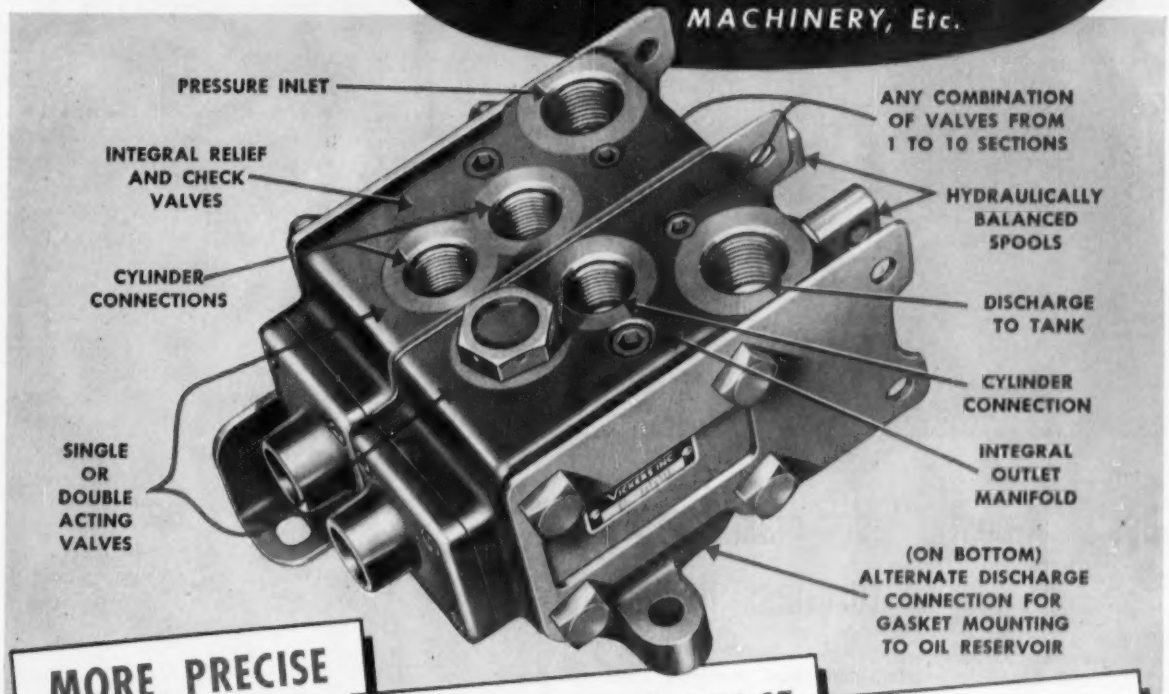
In approaching the isolation problem, one needs to know accurately the characteristics of the item which is to be protected. This information includes the natural frequency of critical components of the item and the peak shock it is capable of withstanding along with the permissible time duration of that shock. The permissible peak shock should be available along each of the three major axes of the item. Knowing these characteristics of the item, one must next consider the environmental conditions to which the packaged item will be subjected, such as shocks and vibrations in transportation and handling.

It is necessary to have an adequate knowledge of the characteristics of isolation systems. It is also necessary that the package designer be able to produce an isolation system of known characteristics and further that he be able to determine the limits of its protection to a given item. Therefore, to provide effective protection to a missile, it becomes necessary to use trial-and-error methods and common sense in packaging designs.

Although testing apparatus in laboratories across the country is fairly elaborate, attaining reproducable results is difficult primarily because of the numerous variables involved. Structural characteristics of the container and isolators change as testing progresses. In shock tests involving impacts, a slight variation in

NEW! Series CM11 VICKERS® MULTIPLE UNIT VALVES

For MATERIALS HANDLING EQUIPMENT, FARM TRACTORS, BUCKET LOADERS, CONSTRUCTION and MINING MACHINERY, Etc.


PRESSURE INLET
INTEGRAL RELIEF AND CHECK VALVES
CYLINDER CONNECTIONS
SINGLE OR DOUBLE ACTING VALVES
ANY COMBINATION OF VALVES FROM 1 TO 10 SECTIONS
HYDRAULICALLY BALANCED SPOOLS
DISCHARGE TO TANK
CYLINDER CONNECTION
INTEGRAL OUTLET MANIFOLD
(ON BOTTOM) ALTERNATE DISCHARGE CONNECTION FOR GASKET MOUNTING TO OIL RESERVOIR

MORE PRECISE CONTROL
Improved Metering Characteristics

REQUIRES LESS SPACE
New Combination Operating-Valve and End-Plate Sections

LOWER COST
Simplified Design and Construction

New, compact, more versatile design of valve. End sections combine in one casting the inlet or outlet manifold plate together with any operating-valve section. Inlet section also contains relief valve. Individual outlet plates available for single unit valves. Single- and double-operating valve sections can be added between end sections as needed. Valve can be adapted for tandem (series) operation. Single-acting valves available for either direction of lever shift.

Other features include protection of pump from reverse flow during shifting . . . three point mounting for more simple installation . . . cylinder connections with ¾-16 N.F.-2 straight threads (AND 10050 type) which conform to SAE standards help insure leak-proof connections . . . optional outlet ports in end section so valve can be gasket mounted to the oil reservoir or pipe connected. Designed for use with Vickers Series V-200 Vane Pumps (up to 11 gpm), the CM11 Valve can be used up to 2000 psi working pressure. For further information write for Installation Drawing M168643.

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ENGINEERS AND BUILDERS OF OIL HYDRAULIC EQUIPMENT SINCE 1921

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Basic "4-poster" idea makes tare-less, low-cost unit pack

A Signode unitizing method that can work for you!

Knowing how to do a job makes doing it seem simple. For example, devising a self-unitized pack of corrugated cartons. Signode Packaging Engineers adapted a *basic* unitizing idea to the job. A base of cartons was laid in the jig. Four corrugated "posts" were placed—one at each corner. The rest of the load of cartons was stacked on top the posts—and the entire load was bundled tightly into a tare-less, low-cost, self-unitized pack with Signode Steel Strapping!

Can self-unitized methods cut your packaging and handling costs? You can find out—without cost to you in any way! Ask to have a Signode fieldman call. In the meantime, send for our folder showing 6 *BASIC* WAYS OF UNITIZING.

SIGNODE Steel Strapping Co.

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Continued

the point of impact may result in a different impulse transmission pattern in the container and isolators. In free fall or drop tests, slight variations in height of fall or release time will appreciably affect the reproducability. The equipment in many packaging laboratories has been designed for comparative testing wherein the effectiveness is proven by the average result and the need for reproducability is not essential.

In summarizing, it may be stated that the intent of this paper is to bring out the following: Criticism of the packaging engineer is often unwarranted and results from a lack of understanding of the packaging engineer's problems. If he designs his package, taking into consideration the known factors presented herein, he cannot be criticized for his lack of knowledge of the unknown factors.

The packaging engineer requires assistance from the design engineer. By this, it is meant that if design engineers were to consider the packaging problem in the design, this problem could be simplified. Cooperation between design and packaging engineers will result in more adequate packaging at a reduced cost.

PRODUCT LOSS . . .

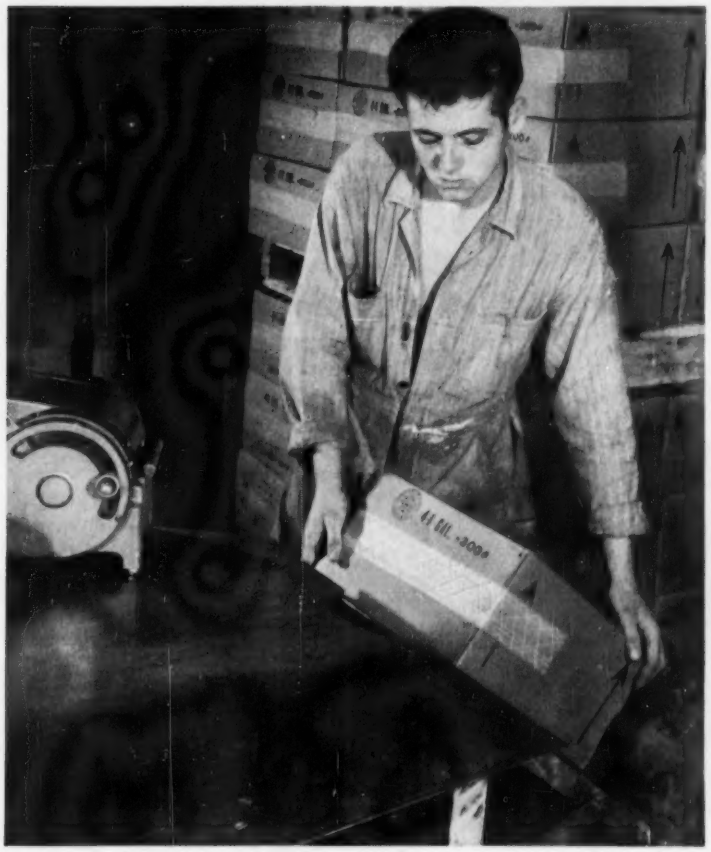
(*Continued from page* 150)

Protecting Against Leaking Liquids

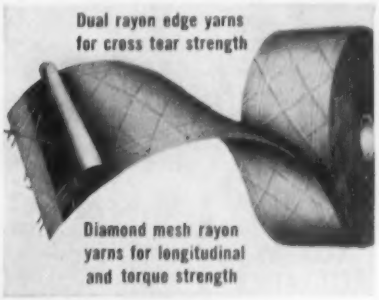
Rohm & Haas, Philadelphia, recently solved a problem in shipping textile and leather dyes through the use of fibre drums with polyethylene liners. Formerly, the non-flammable, non-corrosive liquids were shipped in wooden barrels. The method was costly and in the course of many handlings during distribution leakages sometimes occurred.

The shipping package now used consists of a 55-gallon fibre drum equipped with a separate polyethylene cylindrical liner which is impervious to and capable of retain-

Only SNAKE TAPE is Rayon reinforced for greater shock resistance!



Improved Snake Tape is made to seal heavy telescopic cartons like these. That's because diamond reinforced Snake Tape is made to resist down tear and cross tear! Ideal, too, for rolls and odd shapes because Snake Tape combines *flexibility* with amazing strength and shock-resistance. Choice of five widths: 1½", 2", 2½", 3" and 4".



No other reinforced gummed tape is made with high tenacity *rayon* yarns . . . the same strong, resilient reinforcing used in auto tires to absorb road shock. Snake Tape sealed cartons absorb heavy impact without breaking!

Genuine Diamond Back Snake Tape gives you extra shipping insurance at lowest cost. It is asphalt-laminated for waterproofness; Snake Tape cannot be soaked off — a real protection against pilferage. Send now for complete facts and . . .

Center-seam sealing with Snake Tape is

- At least 30% stronger!
- Two-thirds faster!

Here you see how just one strip of Diamond Back Snake Tape seals heavy cartons of paint.

SEALED STRONGER because — with Snake Tape — reinforcing yarns of *rayon* absorb the shock of impact.

SEALED FASTER because — with Snake Tape — only one strip is used to give a stronger closure.

Center-seam sealing cuts costs for others — It may be an idea for you! Send for free Snake Tape sample.

Free sample

IMPROVED SNAKE TAPE

Angier Corporation, Framingham 13, *Mass.*

Protective Papers for Industrial, Building and Farm Needs Since 1895

Please send free test sample of Angier Snake Tape and complete facts.

Name .....

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ing the dyes. Pinching, undue stretching, or other damage to the liner is prevented by a kraft boot which is extendable about 25% in any direction and is placed between the polyethylene liner and the drum, extending upward about 10 to 12 inches from the bottom.

The open top of the liner is allowed to overlay the top chime of the drum and a disc of the same material as the liner is cemented to the underside of the lid with a full-round gasket. Even though the drum may be opened frequently, it always has a perfect seal. The package has been drop tested by a series of two-foot drops at a 45-degree angle onto a steel plate without any sign of leakage.

Pilferage

The package engineer might ask . . . "What can I do to prevent a thief from breaking into one of our shipments when it is on some dock hundreds or even thousands of miles away?" . . . and feel perfectly justified in denying any blame for such types of loss. The truth of the matter is, however, that there is a great deal he can do to discourage pilfering.

Pilferage is a serious problem everywhere, but it seems to be most prevalent at international shipping points. Would-be-thieves in such places watch for packages of products which they know will bring a high price when re-sold. Radios, household appliances and the like are favorite game of pilferers. One solution is really quite simple . . . don't mark packages in a way which would identify the contents to unauthorized persons. Simple code-markings can be worked out with customers so that identification by them will be simple and quick, but for others impossible.

A simple, but effective method of pilfer-proof packaging has been developed by a manufacturer of dry chemical fire extinguishers. The heavy units are mounted on large wheels and are completely assembled before packaging in wire-bound crates for export. Pilferable attachments are packed in a small container and steel strapped to the tank of the extinguisher. Then, a wirebound mat is wrapped around the unit. The box which has been strapped to the extinguisher cannot be removed without breaking the strap, and even if that were possible, the box would be too large to fit through the openings of the container.

FLOW'S thanks to the following for photographs and information used in the preceding feature: Gaylord Container Co.; Adolph Gottscho, Inc.; Industrial Marking Equipment Co.; Multistamp, Inc.; Wirebound Box Manufacturers Association.

PRINT OR CODE YOUR GUMTAPE BY SIMPLY ADDING "THE TAPE PRINTER" TO YOUR PRESENT EQUIPMENT

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QUICKLY EASILY CLEANLY ACCURATELY

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A quick method of marking to identify contents or for general advertising uses on YOUR OWN GUM TAPE . . . Fast, Effective. Prints as you use your machine for all shipping packages. Ideal for all types of business. Now being used by a host of leading concerns everywhere. A time, money and labor saver

There is a Tape Printer to fit any 3" standard automatic machine . . . with models available for quick change of copy for coding, identifying, dating, etc.

Complete with permanent copy

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Mechanically Simple
Engineered for Long Hard Use
Eliminates Need for Large Inventory
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Distributor of the "Tape Printer"

American Tape Printer Co.

678—6th Avenue New York 10, N. Y.

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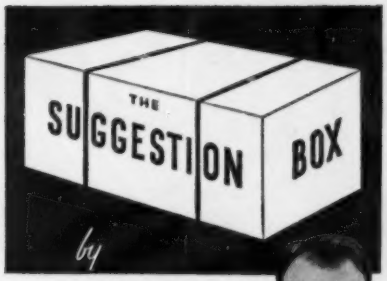
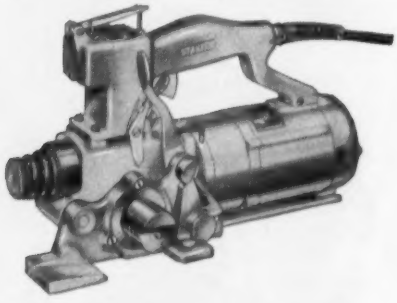
"Hank sure does some fancy strapping."



STANLEY
THE STEEL STRAPPING SPECIALIST

I recommend the Stanley Ace Strapping Tool because time has put it to the test and has not found it wanting. A precision built, quality tool, the ACE has done a good job of speeding up packing and shipping activities, lowering materials handling costs. It can do the same for YOU.



If you ship by rail, car banding will give your product positive protection against damage, reduce pilferage. This Electric Car Banding Tool speeds up the shipping job, power-tightening ¾" or 1¼" band to the desired pre-set tension.

Let Colorgraph "private brand" Strapping . . . provide you with a unique sales promotion medium . . . your Company or product name, trademark, or sales message lithographed on the Strapping in a wide range of colors. Send for information.

by using STANLEY®

STEEL STRAPPING

That's the report from Cuno Engineering Corporation, Meriden, Conn., manufacturers of industrial filters.

Formerly, their FLO-KLEAN Filters — varying in weight from less than one ton up to seven tons, the one pictured being a two-ton giant — were fully crated and braced for safe shipment. Costs mounted. Then, it was decided to car band each shipment made by rail with STANLEY STEEL STRAPPING. Here are the results:

Costly crating eliminated — a tarpaulin now provides complete protection from the elements. ***Expensive bracing unnecessary*** — 2" x .050" Stanley "Car Bands" fastened to the car walls and floor anchor the filter sections securely and give positive protection against damage during shipment. ***Labor costs cut*** — Stanley Car Banding Tools and Equipment get the job done easier, faster. ***Over-all savings*** — $70 on each filter shipped!

For savings like these, invite the Stanley Steel Strapping Specialist to call. ***He can show you how to cut costs too!***

STANLEY **INSURE IT — SECURE IT WITH STANLEY STEEL STRAPPING**

STEEL STRAPPING

DIVISION

THE STANLEY WORKS, 20210 LAKE STREET, NEW BRITAIN, CONN.
Telephone: BAldwin 9-2021

☐ *Please send literature.* ☐ *Please have representative call.*

Name_____
Position_____
Company_____
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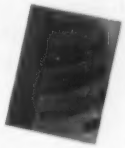

STANLEY TOOLS • STANLEY HARDWARE • STANLEY ELECTRIC TOOLS
STANLEY STEEL STRAPPING • STANLEY STEEL

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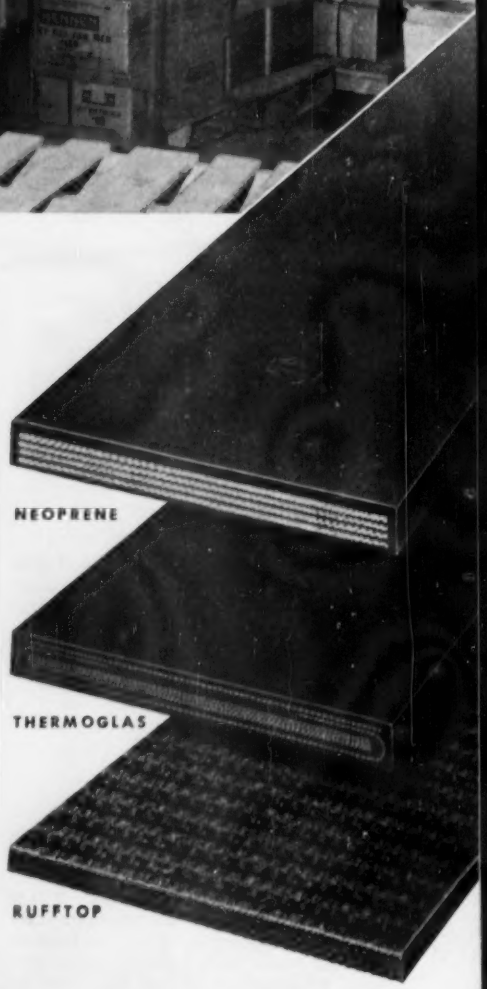
Thermoid Conveyor Belting cuts your handling costs

There's a Thermoid Conveyor Belt designed to lower your costs on every type of materials handling job. Each is best suited for the particular type of service recommended. Here are 3 selected from the complete Thermoid line: **NEOPRENE**—built especially for conditions where heat and oil are encountered; **THERMOGLAS**—designed for use where belt is exposed to temperatures of 275° to 350° F.; **RUFFTOP**—Thousands of irregular gripper points guide smooth surfaced articles up inclines to 35°.

Thermoid's exclusive impregnation process welds carcass and cover into an exceptionally strong, durable belt. Finest quality reinforcement and specially compounded rubber stocks assure long life, less down time, lower handling costs. Your Thermoid Distributor carries a full line of Thermoid Conveyor Belting, Hose and Multi-V Belts to meet your most exacting requirements. He maintains complete stocks and can give you fast service. If you prefer, write direct.



Conveyor & Elevator Belting • Transmission Belting
F.H.P. & Multiple V-Belts • Wrapped & Molded Hose

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Rubber Sheet Packings • Molded Products
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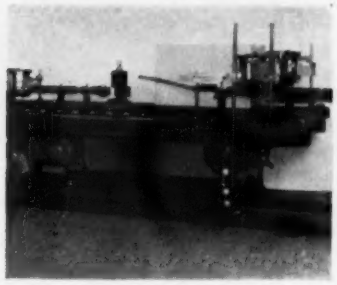
WHAT'S NEW... in Packaging and Shipping Equipment



Multiple Marker

Algene Marking Equipment Co. has announced the development of the Algene Multiple Printer with Power Conveyor and Tunning Device. It prints 1, 2, 3, 4 sides and top of any carton with 1, 2, 3, 4 or more marking heads. Any side may be printed in two colors with the addition of an extra marking head. The power conveyor will support a continuous load of 2400 to 2600 pounds. Adjustments for printing on different size cartons can be made within a ten-minute period.

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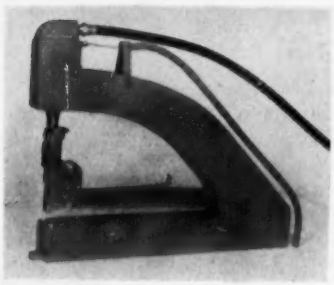

Air-Driven Bench Stapler

Model KAD, an air-driven, foot operated bench stapler, has been announced by Bostitch. Weighing only 15 pounds, this stapler can be moved easily from one job to another and the entire unit can be set up, ready to operate, in a matter of minutes. Foot operation leaves both hands free to handle work, increasing handling speed and reducing operator fatigue. Sixty pounds air pressure is sufficient for almost any job and 25 to 30 pounds is enough for light staples.

Circle No. 206 on Reader Service Card for more information

Dispenser for Heavy Duty Strapping

An electrically operated strapping reel manufactured by A. J. Gerrard & Co. was designed to save time and work in dispensing and cutting heavy duty strapping. Made to handle any size strapping from ¾" x .035" to 2" x .050", the Model 430 Bulkbinder Electric Strapping Reel is ideal for use in steel mills, warehouses, shipping docks or wherever strapping must be cut to length. It operates on 110-volt AC current and one man can control entire unreeling and cutting operation.

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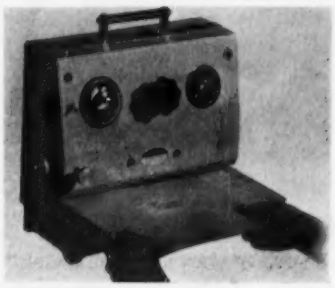

Compact Heat Sealer

A compact, flexible semi-automatic heat sealing machine that seals coated or laminated barrier materials to government specifications has been developed by Fox Hills Tool and Die Co. Called the Comet 54, the unit is comparable in size to a small portable radio. It features an automatic tripping device that controls the heat-sealing cycle and enables completion of the cycle with simple preliminary hand knob settings for time, heat and pressure.

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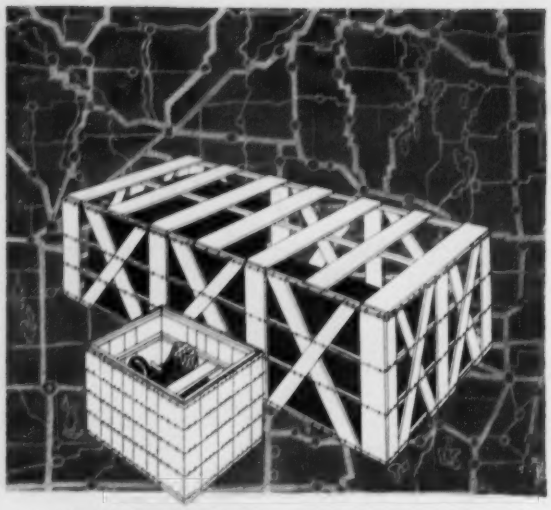
← Circle No. 146 on Reader Service Card



45 pounds or 2325 pounds
No matter where they're bound
SHIP THEM WIREBOUND!

Lower Total Cost
Better Stacking
Faster Assembly
Reduced Weight

Take a look at the boxes shown above and you'll get some idea of Wirebound's versatility. Pound for pound, Wirebound containers give your product the best possible protection. That's because they're made of high tensile steel wire and resilient wood . . . a type of construction that guards against shock — protects while it carries. And Wirebound can carry *any* load, whether it's a 45 pound generator or a 2325 pound power saw. So, for a better, safer way to ship—look to Wirebound. Let a Wirebound Sales Engineer show you case histories that prove the point.

Wirebound
BOXES & CRATES

MAIL THIS COUPON NOW!

WIREBOUND BOX MANUFACTURERS ASSOCIATION
Room 1171, 327 South LaSalle Street, Chicago 4, Illinois

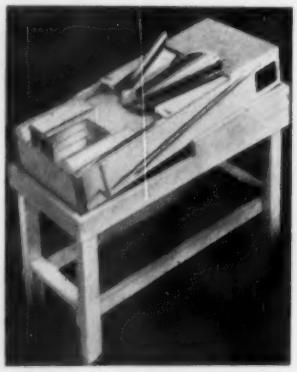
☐ Have a sales engineer give me the whole story
☐ Send me a copy of "What to Expect from Wirebounds"

Name_____
Firm Name_____
Address_____
City, Zone and State_____

Circle No. 161 on Reader Service Card for more information

Low-Cost Bag Packager

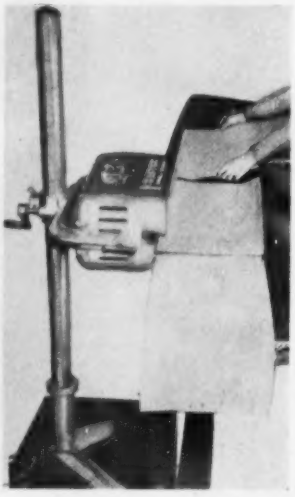
Four important features are claimed for the "Speedy Bag Packager" by Errich International Corp. They are: (1) bag-opening and filling operations are greatly speeded; (2) considerable savings are effected in labor packaging costs; (3) merchandise can be loaded into smaller, more compact and less costly bags; (4) opening and loading of "hard-to-open-and-fill" bags of certain film extrusions is simplified. The machine has two basic functions: it opens up the bag through the assist of ratio air pressure; and it makes possible the easy loading of the product into bags. It will handle bags of all types and widths ranging from four inches to 18 inches.



Circle 209 on Reader Service Card for more information

Production Line Heat Sealer

Production line heat sealing and vacuumizing are said to be possible with the Chaffee Rotor Sealer. The unit is mounted next to a gravity conveyor or table for use. Wing screws on each side of the mounting bracket may be loosened so that the sealer will rotate from vertical to horizontal position to permit the sealing of varying height packages. Lips of a bag to be sealed are inserted in the sealer while the forefinger of the right hand folds down the corner. The unsealed corner is then unfolded, the vauum tube inserted, the air removed and the corner sealed with a hand iron. It will seal any length, any width continuously. Thermostat range is up to 600 degrees F., seal width up to ¾ inches, dwell time is adjustable from two to 15 seconds and pressure is adjustable. Made by Ralph Chaffee & Co.



Circle 210 on Reader Service Card for more information

Semi-Automatic Label Dispenser

Kleen-Stik Products, Inc. has announced distribution of a hand-operated model dispenser for pressure sensitive labels. The unit was said to be

designed for use where labeling volume is relatively moderate. It feeds pressure sensitive labels and separates them from their protective coverings at the same time. To operate, it is only necessary to depress a hand-operated lever. The unit is light weight and easy to carry from one job to another. It handles all sizes and shapes of labels up to two inches wide.

Circle 211 on Reader Service Card for more information

Weather Resistant Tape

A paper-backed protective tape that is said to be 100% resistant to outdoor exposure for protecting smooth surfaces during storage and fabrication was announced by Minnesota Mining & Mfg. Co. Tradenamed "scotch" brand protective tape No. 344, the black paper tape is resistant to outdoor weathering for periods up to six months duration. The tape features a film-like adhesive that sticks immediately upon contact to such materials as stainless steel, aluminum (not anodized), glass, most plated metals, plastic glass, polystryene and polyester.

YOU ought to pack with the AUTO-PAK

Here's Why:

You can package your products for protection, for appearance, for ease in handling with the low cost AUTO-PAK—the versatile machine that eliminates the cost and storage of prefabricated bags and the manual operations of filling and sealing.

The AUTO-PAK automatically forms two sheets of heat sealing material (cellophane, kraft, foil, etc.) around the items to be packaged, seals the four sides, cuts off and delivers a completely sealed, attractive package—as many as one every second in strips, single or double packs. It is giving economical service in 24 different industries packaging 89 different types of products.

It won't cost you anything to get more details on the AUTO-PAK. Write, wire or call today.

PAK-RAPID INC.

530 N. 21st St. Philadelphia 30, Pa. LOcust 7-4840

Representatives

New York Boston Cleveland Cincinnati St. Louis Dallas Los Angeles San Francisco

Circle No. 128 on Reader Service Card for more information

CUSH-ON-STRAP *is the only padded strapping for protective packing of appliances and other finished metal and wood products.*

CUSH-ON-STRAP has giant strength — yet will not stain or mar the finest finishes . . . eliminates shipping damage such as broken catches, hinges, drawer tracks, etc., preventing costly replacements. CUSH-ON-STRAP is tailored for each job. While it is supplied continuous on fibre throw-away reels, the lengths are predetermined with the metal scored for ease in breaking. Standard steel tensioners and sealers may be used, for at each end of a length 6" of metal is free from padding. Saves you money . . . CUSH-ON-STRAP eliminates waste, ends fussy pre-assembly, is applied faster and with less labor. CUSH-ON-STRAP in one product, (steel padded with fluffy cellulose) is a means of strapping everything from automotive finished parts to x-ray equipment, and from household furniture to office equipment. Mail the convenient coupon for full particulars today.

USE THE COUPON to learn how we can serve you in the packing and shipping of your products.

SACKNER PRODUCTS
900 Ottawa Ave., N. W.
Grand Rapids, Michigan

How can CUSH-ON-STRAP lower our shipping and packing costs?

☐ Our products are .....

.....

☐ Please have your Packaging Engineer demonstrate the advantages of CUSH-ON-STRAP.

Firm Name .....

Address .....

By ..... Title .....

Sackner Products
900 Ottawa Avenue, N.W.
GRAND RAPIDS 2, MICHIGAN

Circle No. 137 on Reader Service Card for more information

How to Protect Your Goods

. . . in shipment . . . in storage
Get this FREE 24-page Shipping Guide
Packed full of money saving ideas. Send coupon below
FIBREEN
Protection
IN SHIPMENT . . . IN STORAGE

Here are the facts on how a super-strong, waterproof paper may be your answer to safe, lower cost shipping and storage. Read how rugged Fibreen, in rolls or blankets, gives new, low-cost protection from rough handling, water, moisture, dust, grit and staining. See how it provides protection for machinery, tools, steel, aluminum, rope, textiles, furniture, abrasives, leather, rubber and many other products.

***The coupon below may help you make important shipping savings for your company!* Send it in today.**

SISALKRAFT PRODUCTS

AMERICAN SISALKRAFT CORPORATION

Dept. F-10, Attleboro, Mass.

Please send fact-filled Fibreen booklet on how to save shipping costs.

Name .....

Title .....

Co. Name .....

Co. Address .....

City ..... Zone .... State .....

Chicago 6, Ill. • New York 17, N. Y. • San Francisco 5, Calif.

Circle No. 12 on Reader Service Card for more information

Although the tape's paper backing resists abrasion, occasional fractures in the backing do not harm the rubbery adhesive which stretches to continue protecting the covered surface. It is available in 100-yard rolls in standard widths of 12, 24, and 36-inches, with other widths available on special order.

Circle 212 on Reader Service Card for more information

1/1000 Percent Filling Accuracy

Drum Equipment Corp. reports that a unique double diaphragm on its Diafram Filler assures filling to an accuracy of within 1/1000 per cent in 30 or 55 gallons. The machine consists of an all-steel eliptical shaped filler body which is divided by a double diaphragm. Each side of the body is connected to a common 4-way valve. Liquid to be dispensed is directed under pressure through the valve. This fills the body on one side of the diaphragm and forces liquid on the opposite side of the diaphragm through the other part of the 4-way valve into the drum being

FOR FAST, SECURE, LOW COST BAG CLOSING

FISCHBEIN *Portable* BAG CLOSER

- A *truly* portable bag closer . . . Weighs only 10½ pounds.
- Requires no installation . . . plug into any outlet.
- Handles textile and paper bags.
- Simple to operate and maintain.
- Lowest priced bag closer on the market.

FOR DETAILS, MAIL THIS COUPON NOW

DAVE FISCHBEIN CO.

Dept. 48
38 Glenwood Ave. N.
Minneapolis, Minn.

Name .....

Firm Name .....

Address .....

City .....

State .....

Circle No. 173 on Reader Service Card for more information

filled. Since the double diaphragm partition can move only to one side or the opposite of the filling body and is completely restricted from further travel, discharge from either side is identical.

Circle 213 on Reader Service Card for more information

High-Speed Stapler

An automatic air-operated, industrial stapler, designed for high-speed nailing, crating and production-line packaging operations has been announced by California Wire Products Co., Inc. The device, named Calwire Model CS Stapler, is compact, lightweight and has large staple capacity with a powerful driving ability. It will drive staples up to 1¼" in length and is equipped to handle broad one-inch wide staples for strapping purposes.

Circle 214 on Reader Service Card for more information

High-Production Carton Gluer

Container Equipment Corp. reports that its new carton glue sealing machine, Model 3901B, has features which enable it to provide as much

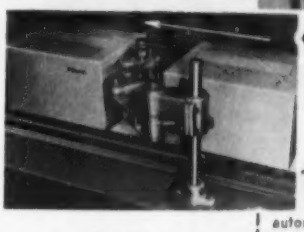
Circle No. 82 on Reader Service Card for more information

For quicker warehouse stacking, quicker identification

MARK ALL 4 SIDES OF CASES AUTOMATICALLY... *in a single pass*

New ROLACODER units attach to conveyor or sealer . . . imprint code-dates, lot numbers on all 4 panels of cases simultaneously . . . without requiring cases to be turned.

ROLACODER 500
MARKING MACHINE
imprints *front* and one *side* panel simultaneously



ROLACODER 200
MARKING MACHINE
imprints *rear* and other *side* panel simultaneously

Friction-operated ROLACODER machines do the marking job automatically . . . save the cost of manual stenciling or stamping. They use interchangeable rubber type for quick, easy changing of copy . . . hold enough ink for eight hours or more of continuous operation.

Descriptive literature sent on request

Gottscho — ADOLPH GOTTSCHO, INC. — Hillside 5, N. J. — 50 Years of Leadership

In Canada: RICHARDSON AGENCIES, LTD., Toronto & Montreal

Counterboy ADJUSTABLE MOISTENING CONTROL:

- Protects your Product
- Saves your tape
- Saves your labor costs
- Improves your carton's appearance
- Impresses your customers

The counsel of Better Packages' 70 Counterboy field experts on *materials and methods* is yours for the asking. They can help you:

- Reactivate all the glue on your sealing tape
- Select special purpose tapes
- Train employees to apply tape correctly
- Saves time and tape
- Systematize your tape closure procedure

CHARLES WISHNER, typical Counterboy man, has an enviable record of helping management utilize their shipping cartons as effective selling tools.

His broad packaging knowledge is based on a wide variety of closure problems he has helped solve for New York City shippers.

Your Counterboy man is listed in the yellow pages of your phone book. Call him today.

Better Packages, INC.
SHELTON, CONN.
WORLD'S LARGEST MANUFACTURERS OF TAPE DISPENSERS

FREE WRITE FOR TECHNICAL BULLETINS.
BETTER PACKAGES, INC.
PLANT NO. 1 - D, 253 CANAL STREET, SHELTON, CONN.

- ☐ #3 Tape Moistening Requirements for Various Carton Surfaces
- ☐ #5 Gummed Tape Glues and Adhesives
- ☐ #7 Superiority of Gummed Tape Closure
- ☐ #9 Tape Applications — Building Strength from Weakness
- ☐ #11 Hot Water versus Dry Glue
- ☐ #12 Carton Sealing — The Easy Way
- ☐ #13 Parcel Post Wrap
- ☐ #16 Tape Widths and Weights

☐ Send us a Counterboy man to survey our Methods and Materials

Company_____
Signed_____ Title_____
Address_____
City_____ Zone____ State_____

Circle No. 30 on Reader Service Card for more information

as 100% increase in production over previous models. Most advanced feature of the new model consists of vertical glue wheels which apply glue in any desired pattern to any or all flaps of a carton. The uniform application of glue is said to assure a neater, cleaner seal. Maintenance and clean-up are speeded by the ease of removal of glue rollers and scrapers. Like other CECO cartoners and glue sealing machines, the semi-automatic Model 3901B requires only a single adjustment to handle cartons in a wide range of different sizes and shapes. Changeover may be made by an unskilled operator in less than three minutes, it is claimed.

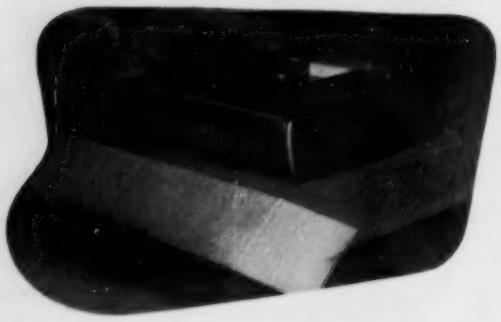
Circle 215 on Reader Service Card for more information

Tape Dispenser Cart

A portable tape dispenser can save many steps and man hours in packing and shipping rooms. Lyon Metal Products, Inc. has announced the Lyon Toter onto which a dispenser may be bolted for quick movement from one working area to another. Drawers can be used for packing tools, extra rolls of tape, labels and miscellaneous items.

Circle 216 on Reader Service Card for more information

READY FOR PACKAGING—
160-lb. trailer in place on bottom section of full telescope carton



Dunbar-Kapple, Inc. *cuts packaging costs* 68.9% with TAPE-STRAP®

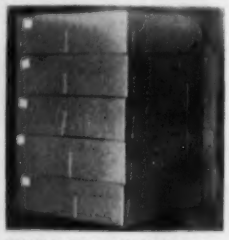
Forty-two cents per unit . . . that's the saving chalked up by Dunbar-Kapple, Inc. since switching to Tape-Strap for container reinforcement.

This company ships 1-wheel metal trailers in full telescope cartons, reinforced with only six strips of one-inch Tape-Strap. Labor and material cost is only 19 cents, as compared with 61 cents per unit for the rigid, all-around banding previously used.

Tape-Strap cuts costs because it combines astonishing strength with quick, easy application. This super-strong, filament-reinforced gummed tape requires no special solvent or costly application equipment. Tape-Strap goes on speedily, safely, without pressure.

Tape-Strap has cut packaging costs for manufacturers of all sorts of products, from nuts and bolts to mattresses, mouldings, and paper. Savings reported range up to 85%.

Why not try Tape-Strap on your containers? Write for free sample roll, and complete data.



READY FOR SHIPMENT—only six short strips of Tape-Strap across sides and bottom hold together the two sections of the heavily loaded telescope carton.

LEADERS IN THEIR LINE

MID-STATES Gummed Paper Company
2525 South Damen Avenue, Chicago 8, Illinois
New York · Boston · Philadelphia · Cleveland · Detroit · St. Louis · Atlanta · Los Angeles

Circle No. 111 on Reader Service Card for more information

LOT LABELLING

Eliminate Shipping Labels! Print Direct!

Quick! Accurate! Easy! Print shipping information direct on cartons, boxes, packages. Eliminate double operation of preparing labels and then pasting them to the containers. Get 1,000 or more clear, sharp impressions from one stencil without re-inking. New FORM-CUT® Stencil has facsimile of your label or shipping form die-impressed into the stencil. Then type or write in address or identification data . . . attach to duplicator . . . and print, like using a rubber stamp. Write for Literature and FREE SAMPLE FORM-CUT STENCIL AND PRINT

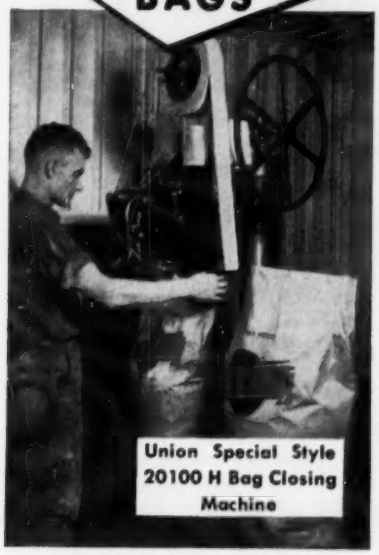
THE ORIGINAL HAND STAMP STENCIL DUPLICATOR

Also for addressing shipping tags and labels . . . prints postcards, menus, forms, bulletins. 8 complete outfits: $9.50 to $99.50, including supplies (f.o.b. factory). At office or shipping room supply dealers.

OVER 30 YEARS **MULTISTAMP** STENCIL DUPLICATOR ®

Circle No. 116 on Reader Service Card for more information

Here's how to close MULTIWALL PAPER BAGS



Union Special Style 20100 H Bag Closing Machine

FOR lower production costs ... stronger, neater closures ... ability to get out rush orders in a hurry, you can't beat Union Special Bag Closing Machines! Specially built to stand up under heavy production schedules, these machines provide the high output rates needed to meet modern competitive conditions.

In the Union Special line, it's easy to find the right unit to meet your requirements. ASK FOR RECOMMENDATIONS.

SEND FOR THIS BULLETIN!

It's easy to find just the right unit to meet your individual needs in Union Special's big line of bag closing machines. Ask for a copy of Bulletin No. 200, "UNION SPECIAL FILLED BAG CLOSING MACHINES."

Union Special

MACHINE COMPANY

415 N. FRANKLIN ST., CHICAGO 10, ILL.

Circle No. 150 on Reader Service Card

MOISTURE . . .

(*Continued from page* 150)

Similar methods of packaging can be used for short and long-term yard storage and for protection of shipments.

Volatile Corrosion Inhibitors

Volatile corrosion inhibiting VCI chemicals are used in crystalline or liquid form for protection of ferrous and aluminum materials. They have the property of inhibiting the moisture in the air around them as they vaporize. Also, they passivate the metal surfaces on which they are used so that oxidation of the metal does not occur, or is greatly reduced. For preservative packaging the desirable properties of a corrosion inhibiting chemical are: quick effectiveness; long life; stability under wide temperature changes; suitability for a variety of metals; non-toxicity; no disagreeable odors.

A volatile corrosion inhibitor can be used for packaging by plac-

- **SO FLEXIBLE** . . . *Conforms to any shape.*
- **SO CUSHIONY SOFT** . . . *Absorbs transmission of shock, vibration and pressure damage.*
- **SO LOW IN COST** . . . *You can use it freely*

Industry's newest 100% flexible wrap material gives your products the protection they need from jars and jolts *at new low costs!* SOF-RAP is a multi-wall krinkled cushion material that provides stretch and permits "slippage" . . . safeguarding against abrasion damage from friction and chafing. Soft-resilient inner cushion is strip-laminated to a tough, durable protective outer wrap that resists tears and punctures — perfect for exterior-interior packaging. Cushion sheet is also available without outer sheet backing for use where only interior protection is required.

Send for this Free Booklet.

NICHOLS
PAPER PRODUCTS COMPANY
GREEN BAY · WISCONSIN

Circle No. 120 on Reader Service Card

New Ways to Cut Your Shipping Costs and Time...

With **Weber** Label and Marking Systems

Tab-On Stencil System

Stencil is prepared in same operation as invoice or bill of lading

The new Weber Tab-On Stencil adheres over "ship-to" area. In one typing, forms and stencil are prepared. Stencil clips on Weber hand printer for addressing direct-on-container at a rate of 50 per minute.

Direct to Container System

Just One Stencil Print facsimile labels and address direct-to-container in one fast operation

Now low cost stencils already custom cut with a facsimile of your own shipping label. By just typing the "ship-to" address on these stencils . . . clip on Weber hand printer and you're ready to print shipping label and address direct to container in one fast operation.

Custom Label System

Prints and Addresses Any Size Label In One Operation

Low cost machine prints shipping or product identification labels and automatically cuts them to size. Simultaneously, it duplicates the shipping address or other information. Prepares and counts 100 labels per minute. Prints from inexpensive stencils.

Send For FREE Folder on WEBER Systems

WEBER LABEL AND MARKING SYSTEMS
Div. of Weber Addressing Machine Co.
Mt. Prospect, Ill. Dept. F-10
Send me free folder giving detailed information on
☐ Weber Tab-On System
☐ Weber Direct-to-Container System
☐ Weber Custom Label System
Name_____
Firm_____
Address_____
City_____ State_____

Circle No. 157 on Reader Service Card

Circle No. 58 on Reader Service Card for more information

THE MOST TALKED ABOUT GUMMED TAPE DISPENSER ON THE MARKET!

THE MEDIUM PRICED
Super
DERBY "152"

A Derby First!
Cut-Off Blade Guaranteed for the Life of the Machine!

- Exclusive Spring Clutch Feed
- Feed Stop for Predetermined Lengths up to 30"
- Dispenses 1" to 3" width
- Auxiliary Water Reservoir
- Single Brush Moisture Control System
- Adjustable Variable Length Slotted Handle
- Interlocking Side Frames
- Automatic Tape Cut-off
- Visual Measuring Scale

PRICED FAR LOWER THAN ANY COMPARABLE MACHINE!

Derby spent 2 years designing, building and testing the fabulous Super "152." It's a rugged, efficient, gummed tape dispenser with so many big machine features, so many unusual Derby exclusives, that its low price is truly sensational!

See your dealer or write Dept. F

DERBY SEALERS INC. Derby, Conn.

Pays for itself in Less than 100 days

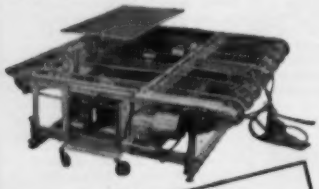
FRIED Stripveyor Patented

makes sheet handling wholly mechanical

Automatically picks up cut strips, conveys them beyond shear bed. Makes shear 100% efficient. Adjustable to any height up to 45"—synchronous to shear speed—handles any gauge sheet up to ⅜", widths as wide as allowable by standard 20" back gauge, lengths to size of shear. Portable! Caster-supported carriage supplied with floor locks.

SHEAR TO .005"

FRIED Liftveyor Patented



Enables clean-cut wide shearing to .005" *regardless of material.* Eliminates flexing—supports sheet from underside while sheet edge is against back gauge—then conveys it beyond shear frame. For sheet or plate up to ⅜" thick.

For complete strip handling convenience add FRIED Strip-Stacker to Liftveyor or Stripveyor. Write for full details today!

FRIED STEEL EQUIPMENT MFG. CORP.
528 EAST 119th ST., NEW YORK 35, N. Y.

Circle No. 73 on Reader Service Card for more information

MOISTURE

Continued

ing it, in crystal form, in a package containing parts to be protected; by blowing the crystals into an area (as in aircraft engine ports, cylinders, etc.); or by dissolving it in a water or alcohol solution and spraying it on the parts or products to be protected.

One of the most effective methods of using VCI involves the use of papers to which crystals of the inhibiting material have been applied. These papers are available as wraps or as envelopes.

VCI papers can be laminated to polyethylene, foil, burlap or the inside of boxes. Additional tear-strength is achieved in some types of papers by placing glass fibers between plies of sheets during lamination.

Desiccants

Sometimes moisture damage occurs within packages even though they are carefully water-proofed.

CAPCO DOCK COVERS GIVE YEAR 'ROUND PROTECTION

CAPCO Dock Covers completely enclose the space between car and building doorways protecting loading and unloading during bad weather . . . preventing accidents . . . insuring against loss of heat or refrigeration. 51 different models in any size for every loading problem.

Write for literature and name of nearest distributor.

CAPCO

622-24 PROSPECT AVENUE • KANSAS CITY 24, MISSOURI

Circle No. 42 on Reader Service Card

Products like pharmaceuticals, cereals, crisp baked goods and confections can be easily damaged by high relative humidity and temperature. Such products may lose their strength, freshness, stick and cake together, or hydration of some products takes place (the premature action of effervescent compounds, etc.). The shelf-life is limited and customer complaints and returns become excessive.

To solve this problem there are several types of granular moisture absorbents which you can use. These materials absorb moisture in the atmosphere but at the same time remain perfectly dry. Thus, any moisture present at the time of packaging is absorbed as is any incoming moisture which might not be completely excluded by packing material.

For a desiccant to work effectively, a water vapor resistant container or wrapping should be used.

Good Closure Important

Halter's Pretzels, Inc. recently discovered the advantages of properly closed shipping containers. The company produces nearly 25,-

Circle No. 105 on Reader Service Card for more information

OWN THIS AMAZING marforge LOADMOBILE FORK TRUCK

For $2.89* per day!

THE MIGHTIEST LITTLE TRUCK EVER MADE

Actually smaller than your desk!

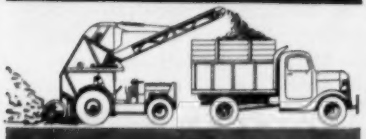
Lifts 2000 pounds (Plus 20% overload)
Weighs only 2600 pounds (with Battery)
Turns on a dime. — Gets in and out of narrowest aisles.
Tough — like all "MARFORGE" "Performance-Engineered" Equipment.
Fork Lengths up to 72" — Load Centers to 36". Also available with gas-electric drive.
LOADMOBILE FORK TRUCK 68" Telescopic Model. Free lift 48" with only 68" clearance required.
Maximum Lift 96".

*Write for details about the Sensational New MARFORGE "RENTAL-LEASE-OWN" PLAN. 57 Years in the Materials Handling Industry

Market Forge Company
EVERETT 49, MASSACHUSETTS

longest trucks

highest trucks



loaded FASTER with a B-G LOADER

GET THE DETAILS. SEND FOR THIS FREE BOOK

see your B-G distributor or write

Barber-Greene
AURORA, ILLINOIS, U.S.A.

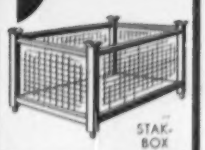
Circle No. 25 on Reader Service Card

CUTTING Your Costs IS OUR BUSINESS

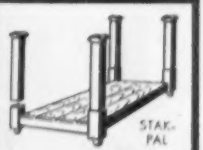
IT CAN BE DONE with ERCO STAK-PAL SYSTEM of Material Handling

STAK-PAL tubular stacking racks have been designed to handle quickly and efficiently your every storage need. Stacking operations are safer, easier and trouble-free with removable corner posts or end frames. QUANTITY PRODUCTION, STANDARD SIZES and our own SEAMLESS TUBE MILL assure you of a low cost product, combined with quality workmanship. All STAK-PAL tubing, square or rectangular has minimum 11 gauge wall for rugged strength and almost complete elimination of maintenance costs. Specials made to specifications.

Let us prove these facts —
Write for catalog giving you complete information.

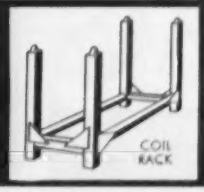


STAK-BOX



STAK-PAL

C. E. ROBINSON CO.
Manufacturers of Metal Products
222 COLBURN AVENUE
JOLIET, ILLINOIS



COIL RACK

END FRAME RACK

Circle No. 135 on Reader Service Card for more information

Circle No. 55 on Reader Service Card for more information

NOW! SHAFT DRIVE POWER in LIGHT hauling!

TOTAL OPERATING COST ¾¢ PER MILE

• EXTRA POWER
• EXTRA CAPACITY
• EXTRA ECONOMY

Slash inner plant handling and delivery costs as have hundreds of other plants. Put Cushman 780 TRUCKSTERS on your jobs—NEW this year with SHAFT DRIVE. Complete with 3 speeds forward, one reverse. Get the EXTRA power advantages of big vehicle shaft drive—plus quick, easy handling AND low operating cost—less than a penny a mile. With capacity up to 500 pounds, TRUCKSTER can speed up hundreds of handling jobs for you!

Cushman 780 SHAFT DRIVE TRUCKSTER

• Write for FREE illustrated booklet
• See Your Nearest Cushman Dealer for FREE demonstration

SOLD and SERVICED NATIONALLY

CUSHMAN MOTOR WORKS, INC. 905 No. 21st St. Lincoln, Nebraska

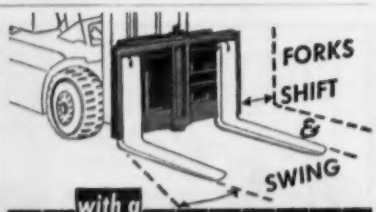
Neiman MANUFACTURERS SINCE 1932 QUALITY STEEL SHELVING AND STEEL SHOP EQUIPMENT

Write for latest catalog

Dealers' and Agents' Inquiries Invited DEPT. A

NEIMAN STEEL EQUIPMENT CO., Inc.
BALFOUR and VENANGO STS., PHILA 34, PA.

Circle No. 189 on Reader Service Card



with a SWING-SHIFT UNIT
HYDRAULIC FORK CONTROL ATTACHMENT
ADDED TO YOUR LIFT TRUCK

Ask us how SWING-SHIFT:

• Turns load ahead of truck around corners.
• Reduces aisle width 19% to increase your storage capacity.
• SWINGS and SHIFTS loads quickly into exact alignment without moving truck.
• Speeds box car loading by reducing truck maneuvering.

SWING SHIFT AISLES ARE NARROWER

UNITS AVAILABLE FROM 3,000 TO 16,000 LB. CAPACITY

See Your Lift Truck Dealer or Write

SWING-SHIFT MFG. CO.
P. O. BOX 957
LONGVIEW, WASHINGTON

Circle No. 144 on Reader Service Card

000 pounds of pretzels, potato chips and popcorn daily.

The problem confronting Halters was one of moisture penetrating into cartons and causing the product to become soggy. It was decided that in order to prevent moisture from entering under normal conditions, the pretzels would have to be packed tightly and the shipping containers would have to be sealed in a manner which would insure against premature opening but would still provide for easy opening at the retail outlet.

The sealing medium which was decided upon was 2½-inch, 35-pound water-activated paper tape because of the lightness of the product. To insure a strong seal every time, an automatic tape dispenser which automatically moistens as it dispenses was purchased.

The results at Halters have been completely favorable. Due to the speed and accuracy of the dial-type dispenser, the proper length of tape is insured every time. Waste has been cut to a minimum. But, better yet, packages seldom open prematurely and moisture damage has been all but eliminated.

The package engineer's insurance that the packages he designs will give adequate moisture protection throughout all handling and transportation lies in the correct use of a good closure material. There are a wide variety of excellent types of pressure-sensitive tapes, water-activated tapes, reinforced tapes, adhesives and heat-seal materials which are designed to give complete protection against moisture.

Here is a generally acceptable rule of thumb for selection of water-activated paper tape:

For center slotted type boxes carrying less than 50 *pounds . . . use* 60# *tapes no less than two inches wide, preferably three inches wide; for containers over* 50 *pounds use* 90# *tapes, three or four inches wide. For light weight overlap flap boxes . . . use* 60# *tapes; for heavy overlap flap boxes . . . use* 90# *tapes, three or*

four inches wide.

Pressure sensitive tapes come in a wide variety of backings (cellophane, acetate fibre, flatback paper, cloth) and may be used for sealing all types of containers including boxes, cans, corrugated and fibreboard tubes, bottles, bags, etc.

There are available plastic and metal foil tapes which have been specially designed to protect against moisture vapor transmission due to excessive humidity. Some have been developed to retain their high strength and complete bond to the package even when subjected to extended soaking rainfall.

FLOW'S thanks to the following companies for photographs and information used in the preceding feature: Aeroil Products Co., Inc.; American Sisalkraft Corp.; Angier Corp.; Bemis Bros. Bag Co.; Berlin & Jones Co., Inc., Industrial Packaging Div.; Culligan Inc., Desiccant Div.; Marsh Stencil Machine Co.; Nox-Rust Chemical Corp.; R. M. Hollingshead Corp.; Shell Oil Co.

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12" Rough Top cleated belt elevates material up or down, forward or back; gas or electric power. Standard lengths 10' to 20'; others available.

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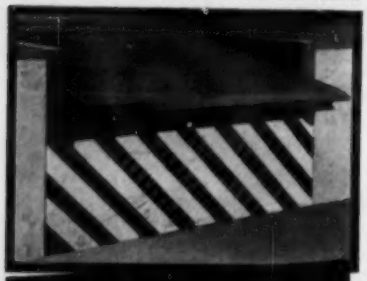

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UP, DOWN, IN & OUT
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TWO MODELS
6' x 6' & 6' x 8'
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Up to 20,000 Lb. Capacity
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FINGER-TIP CONTROL

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INSURANCE . . .

(*Continued from page* 134)

ciation members alone in 1953 reported O.S. & D's of almost $5,000,000. In maritime shipping we draw a blank in the absence of any central agency to which steamship carriers or marine underwriters report their losses on overseas shipments. But even where total loss figures are unavailable it must be recognized that preventable losses are recovered from insurance companies. And again, the shipper's premiums are going to be directly proportionate to his losses.

The loss cost picture now becomes more clear. It can readily be seen that a part of the insurance premium goes to offset the non-preventable losses that are of a major or catastrophic nature. Another, and a substantial part of the premium pays for the preventable losses . . . and over these you, the packager and shipper, can exercise almost complete control.

Take, for instance, the case of a highly progressive exporter of a manufactured product quite susceptible to both breakage and pilferage. In the past, the product has been shipped overseas in plain wooden boxes with no quick identification to tempt the would-be pilferer. His "packaging engineers" decided that they could henceforth safely pack exports in containers of much lighter and cheaper material than the old. This, they felt, would effect substantial savings. (It soon became necessary to adjust premiums accordingly.)

At the same time, it was also decided that the identity of the product and maker would be emblazoned on the new container's outer walls. This was in stimulating contrast to the former plain wooden exteriors that merely carried blind marks and numbers and identified the routing and destination. Pilferage losses promptly showed a terrific increase and hard on the heels of that trend came a comparable increase in insurance rates. So, whose loss was it?

Then there was the machinery

ONLY VERSABAR RACKS
GIVE YOU THESE EXTRA'S
WITHOUT EXTRA COST!

• NEW CLAMPING NUT
No slip feature for positive locking.

• BRIGHT GALVANIZED FINISH Salt-spray tested. Corrosion resistant.
Pay no more than for ordinary enamel finish.

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all TUBULAR STOOLS

• Finest in design
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6 MODELS

In five heights • 18" • 22" • 24" • 26" • 30" • 4-way adjustable backs • Choice of steel or wood seats.

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Manufacturers of Quality Steel Equipment since 1936

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manufacturer who wet his big toe in export by obtaining a $1,000,000 order from a South American firm. The shipment, which consisted of many machines, went forward with each machine in a heavier than domestic outer container, but with no additional internal blocking and bracing. The sheathed crates arrived in perfect condition, but the internal damage to the machines, due solely to the inability of the blocking and bracing to withstand normal export handling, resulted in over $40,000 in repair and replacement costs and over six months delay in getting a waiting factory into production. Whose loss? It is sufficient to say that there were no more orders from that customer.

One gets a sense of real satisfaction out of the experience of a man who is in the business of handling the world-wide export sales for a number of American manufacturers. Two of his products are quite fragile and, some years ago, his insurance rates on these items were terrifically high, for of necessity they reflected the frequency and high cost of his

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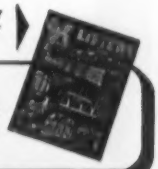
1 man ...handles Sheet Steel Faster, Easier with a C-F LIFTER

C-F Lifters, under one man operation, pick up, carry and unload more sheet steel tonnage per hour than any other method – and at lower cost per ton. Wide carrying angles hold sheets securely – won't damage high grade sheets; tong action insures safe carrying; fast opening and closing adjustments of Lifter jaws permit shifting from one size pack to another in seconds. C-F Lifters are made in standard or semi-special models to handle from 2 to 60 tons.

Write for Bulletin SL-28 for specific examples of C-F Lifter operation and economy.



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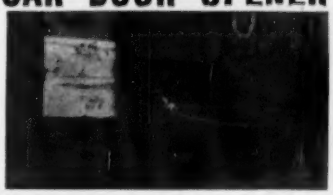

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New safety and efficiency features now make the Nolan 1-Man Car Door Opener a more necessary labor-saving money-saving help than ever before.

Many thousands in constant daily use!

Free Literature. Order one or more NOLAN Model-H Car Door Openers now. Catalog on request.

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Circle No. 34 on Reader Service Card

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BATTERIES
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BOWER BATTERY & SPARK PLUG CO., READING, PA.

INSURANCE

Continued

losses. Moreover, his only shipments of these items were to Havana and San Juan, both relatively "good" destinations from the marine underwriter's viewpoint.

Over a five-year period, in cooperation with his underwriter and the steamship companies, he patiently studied his damage reports and made changes in his box and crate designs. Many of these packaging changes not only eliminated previous damages, but reduced tare weights and actual packaging costs through the use of lighter, but more intelligently used, frame members and braces.

Today, those two fragile products are being shipped all over the world at lower landed costs—thanks to an overall 40% reduction in packaging costs and a well earned 50% reduction in insurance rates. The losers in this case? . . . His competitors if any.

On the indirect and intangible loss side, the price tag is often far more staggering than the cost of

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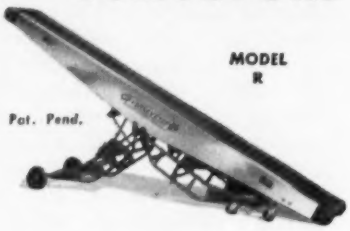
HANDLE More FOR Less!
WITH BELT PORTABLE CONVEYORS



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Manufacturers, warehousemen and retailers find this handy unit the quick, easy way to speed up materials handling and slow down costs. Lengths to 19 ft. with or without undercarriage, up to 25 ft. for floor-to-floor applications. Distributed loads up to 300 lbs.

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PREST-O-MATIC
Packaged DOORS
pay
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Dollar cost for a fork lift truck and operator runs high. Don't waste it opening old-fashioned, hand-operated doors. The CLARK PREST-O-MATIC DOOR opens in as little as 3 seconds. Expedites traffic . . . no slowing of truck or operator . . . completely safe . . . improves critical temperature and humidity control . . . prevents drafts. A PACKAGED, COMPLETE DOOR UNIT with highest quality materials, hardware and motor. Two men can install it in three hours. Used by country's largest concerns. Send for new booklet.

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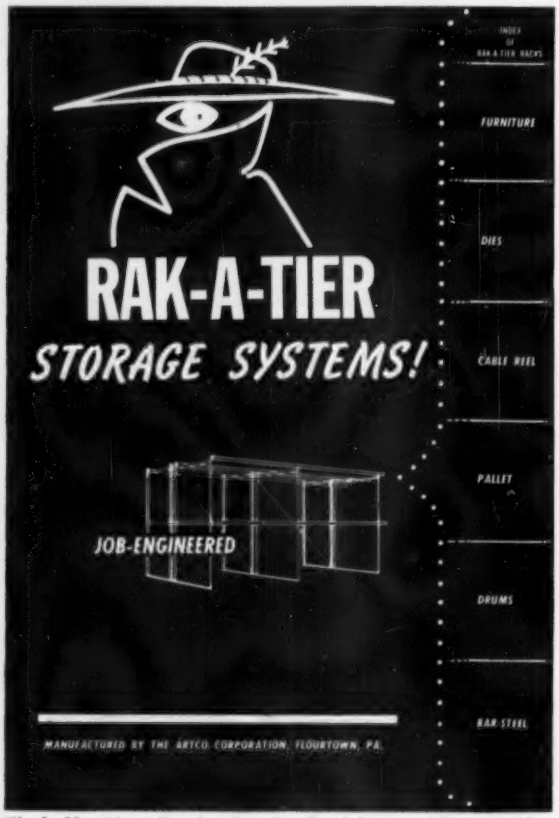

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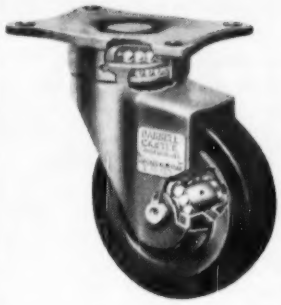
PERFORM MORE EFFICIENTLY AT LOWER COST AND LAST LONGER!



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RUBBER TREADS . . . a wide choice of treads suited to all types of floors, including Darnelloprene oil, water and chemical-resistant treads, make Darnell Casters and Wheels highly adapted to rough usage.

RUST-PROOFED . . . by the Udylite process. Darnell Casters give longer, care-free life wherever water, steam and corroding chemicals are freely used.

STRING GUARDS . . . Even though string and ravelings may wind around the hub, these string guards insure easy rolling at all times.

LUBRICATION . . . all swivel and wheel bearings are factory packed with a high quality grease that "stands up" under attack by heat and water. Zerk fittings are provided for quick grease-gun lubrication.

Always SWIVEL and ROLL

A TYPE AND SIZE FOR EVERY PURPOSE

Free Manual

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the physical loss and damage. Market losses can be staggering when seasonal goods come a cropper enroute and cannot be replaced in time to catch the seasonal sales.

The matter of customer relations has been emphasized so often in loss and damage writings that we shall not belabor it unnecessarily here . . . Yet, there comes to mind a shipment of machinery valued at over $240,000 now enroute from Europe to the United States. Should it be damaged to an extent that replacement is needed, the manufacturer awaiting these machines faces a consequential loss of $1,500,000 through loss of earnings and the cost of fixed factory expenses that will continue while he is awaiting replacement.

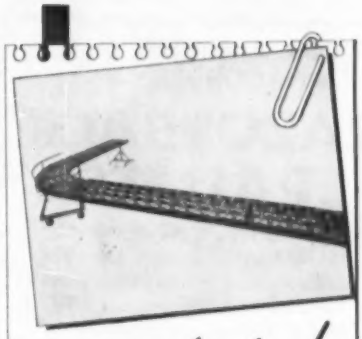
Losses, be they fortuitous or preventable, are ultimately for your own account and our statistics clearly reveal that the dollar value of preventable losses is much the greater. There is little doubt that he who has earned the lowest insurance rates is the one who has experienced the least losses. And you can be sure that he also does more business than his competitor. If he doesn't, he soon will.

SPECIAL TRUCKS . . .
(Continued from page 84)

Solution: Three-wheeled fork trucks were designed for use with special racks to support the finished bodies. The trucks upend and store the bodies vertically—three times as many in the same cubic area as compared with previous horizontal storage. Split-second assembly line schedules have been maintained.

Problem: How to devise an efficient mechanical means of dumping briquettes of alloying material from a drying rack was a question that was posed recently.

Solution: A standard fork truck was equipped with a hinged platform operated by a winch in back of the uprights. The loaded rack is automatically secured to the platform when picked up; operating the winch tips the platform, dumping the load. Accordingly, manual handling was eliminated with an accompanying



good idea!

To cut your handling cost choose the right type of wheel conveyor. Make gravity work for you. Steel ARR-O-WHEEL for those heavier duty permanent jobs. Aluminum frame, steel wheel ARR-O-LITE for rugged service where portability is a factor. All aluminum ARR-O-LITE for those lighter duty jobs – easily moved – set up – job completed – tear down and store in small space.

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GOOD IDEA!

Take *all* your handling problems to an ARROW specialist. Here are just a few:

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PINE BLUFF, ARKANSAS

SPECIAL TRUCKS

Continued

sharp reduction in physical effort, man-hours, and handling inefficiency.

Problem: One foundry was troubled with the task of manually handling red hot castings from the ovens to and into quenching tanks. In addition to the safety problem and the physical effort involved, the existing operation consumed a disproportionate amount of time.

Solution: A fork truck was engineered to permit loads to be lowered below floor level. Skid loads of hot castings are now picked out of furnaces, delivered and lowered into the quench tank which was built into the floor. One continuous operation does the trick, and, in addition, the truck can also be used for regular handling operations.

Problem: Faced with an $80,000 paving job in its repair yard, one of the major railroads requested help in adapting a standard industrial truck for operation in the outside area without the need for regular pavement.

Solution: A standard industrial mobile crane was equipped with flanged car wheels, instead of conventional rubber tires, to operate on the tracks themselves, saving the railroad thousands of dollars in paving costs.

Problem: A leading Chicago printer asked for a way to deliver rolls of paper to his presses, which were in scattered locations.

Solution: The platform of a high-lift platform truck was replaced with a pair of forks, which were hinged at the ends to facilitate loading and unloading. By moving two rolls at a time it is possible for the truck to deliver 40 rolls per hour. An overhead hoist helps load rolls into the presses.

Problem: Four men were needed to crank-close the bottom dump gates on iron ore rail cars in an upper Great Lakes port. Excessive physical exertion, the great chance of personnel injury, and the lengthy time required were three important disadvantages. A

LEITELT TWIN SCREW

Forms part of dock when not in use.
18 inch vertical adjustment Capacity:
7½ tons of live load on any axle:
10 tons dead weight.

★ Positive drive screw lift
Board always under complete control

★ 15" hinged plate follows truck up or down
Requires no manual adjustment

★ Built in two sizes to fit your needs
6' wide; 6' and 8' long

★ Complete, self-contained power unit
Ready and inexpensive to install

★ Safe with unbalanced load
Twin screws support two front corners of dock

★ Automatic safety controls
Dock stops automatically at top and bottom limits

★ Operates in any kind of weather
All working parts fully protected against dirt and weather

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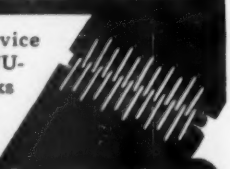

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With the Clipper No. 9 Portable Lacer, you can lace up to 6 inches of belt in one quick, easy operation. For wider belts, merely repeat the operation.

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Clipper

BELT LACING EQUIPMENT

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mechanical means was obviously needed.

Solution: An industrial truck was uniquely adapted to the job. A fully adjustable powered wrench was built on the platform of the truck. Now a single man can open or close the gates in a matter of seconds without any physical effort.

These are but a few of the many examples of how specially designed industrial trucks eliminated difficult handling problems. In the final analysis, however, it is the industrial truck manufacturer who can supply the absolute answer as to the possible savings from specialized equipment. If a doubt exists, it is a "must" to consult a manufacturer to determine whether your handling system is giving you maximum economy. No one seeks to sell a "special" where a standard truck will do the job. On the other hand, it could be a very costly practice to "make do" with a standard vehicle when a "special" is needed. And most dollar-wise material handling men can recognize the cost figures that will prove the investment in specialized equipment.

In considering the economies of special trucks, an important consideration is the cost necessary to keep the truck in service. (This applies as well to standard trucks.) The cost of truck operation, the amount of down-time, the cost of replacement parts, and the general cost of maintenance, are elements that must be observed at all times. An inexpensive truck may be far more expensive when such costs are added to the original purchase price. And, conversely, a more expensive truck may save a company considerable money in economical operation.

For pictures and data, FLOW thanks, in addition to Elwell-Parker Electric Company, the following firms:

Automatic Transportation Co.; Baker-Raulang Co.; Clark Equipment Co.; Crescent Truck Co.; Division of Barrett-Cravens Co.; Gerlinger Carrier Co.; Hyster Co.; Lamson Mobilift Co.; Lewis-Shepard Prods. Inc.; Mercury Mfg. Co.; Raymond Corp.; Towmotor Corp.; and Yale & Towne Mfg. Co.

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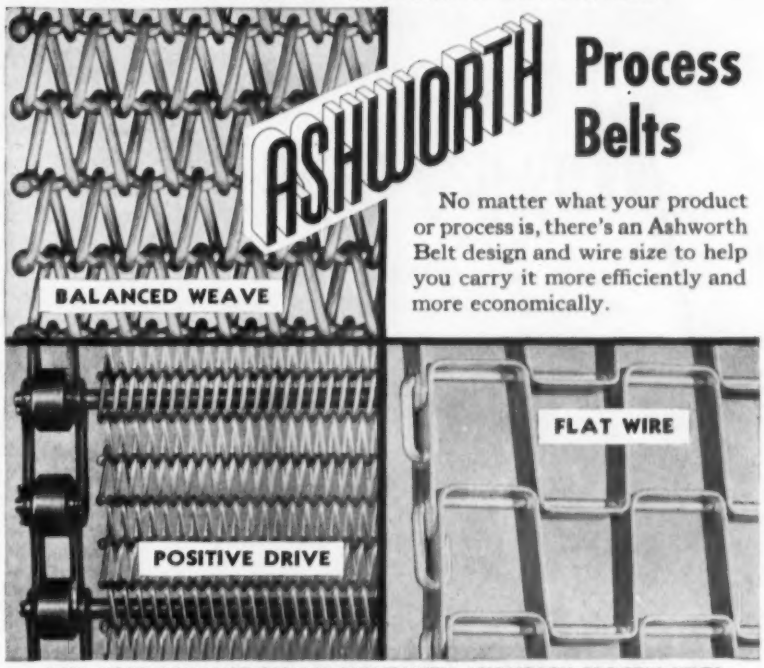

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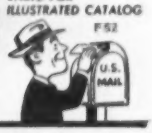

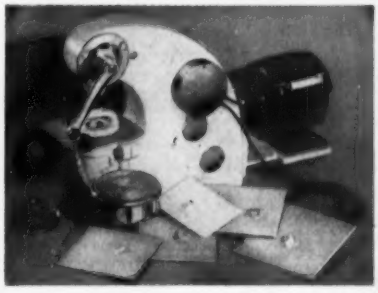

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Meeting CCC, ASTM and TAPPI Standards. Precision Built. Write for Complete Catalog and Price List.
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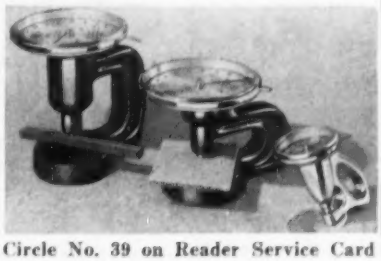

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Our engineering services are available for your specialized needs.

Over a quarter century of service.

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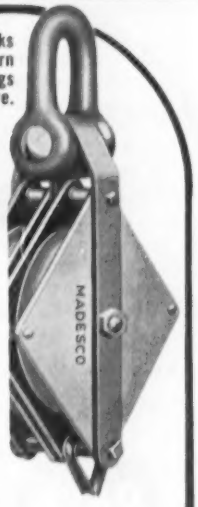

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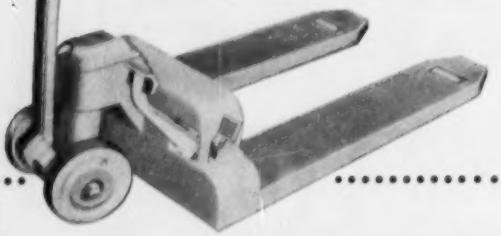

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$350.00 for complete truck!

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RACK

RACK HYDRAULIC EQUIPMENT CORPORATION

Connellsville, Pa. F-1054

Send complete data on the "Turnabout" Pallet Truck

Name_____ Title_____

Company_____

Street_____

City_____ Zone____ State_____

Agents in principal cities of U.S., Canada and Europe

Circle No. 131 on Reader Service Card for more information

NEW EQUIPMENT . . .

(Continued from page 42)

Stainless Steel Dumper

The Prime-Mover Company has announced that its Model 15 is available with a stainless steel dump bucket. The special unit is furnished for hauling waste and materials in process in food processing plants, tanneries and other plants where acids, salts and other corrosive materials are handled. The large dump bucket has a liquid capacity of 10 cubic feet, and the Prime-Mover with the bucket has a load capacity of ¾ ton up 20 percent inclines.

Circle 217 on Reader Service Card for more information

Steel Floor Trucks

A complete line of round-cornered, knocked-down steel floor trucks, designed for use in the textile, warehousing and metalworking industries, has been introduced by Kennett Equipment & Machinery Company. Five standard sizes are available. All models feature a smooth rolled top, 18-gauge cold rolled steel construction, angle base frames, channel caster supports, and five-inch roller bearing steel casters.

Circle 218 on Reader Service Card for more information

Scoop Shovels for Bulk Handling

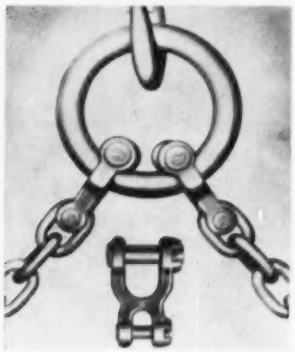
Buda Company announces the development of two Scoop-Type Shovels, hydraulic and mechanical, to supplement its line of attachments for Buda fork trucks. The attachments are designed to handle loose or bulk materials, such as: coal, cement, core sand, feed and fertilizer when loading and unloading trucks, wagons, hoppers, bins, etc. The attachments are said to be easy to mount, and are interchangeable with standard forks. The

mechanical shovel mounts directly to the fork hanger bar. The hydraulic shovel mounts in the same manner, but is connected to the truck's hydraulic system by quick-detachable hydraulic hose couplings. The mechanical shovel is released by cam lever action.

Circle 219 on Reader Service Card for more information

Fast Link Connections

A connecting link for fast on-the-job connections of chain to rings, end links, shackles, eyes, etc., has been developed by The Thomas Laughlin Company. The new fitting is called a Double Clevis Link and consists of two clevises joined back to back with pins heat treated for extra strength. With a Double Clevis Link, slings and hitches may be made in the field with only a pair of pliers or a screw driver. The link is said to save time and money by doing away with welding and blacksmith work. It is made for chain sizes: 1/2", 1/4", 5/16", 3/8", and 7/16".



Circle 220 on Reader Service Card for more information

Draw from the Nutting Library of Material Handling Helps

Jr. Catalog 54 G—General Purpose, Warehouse Trucks, Casters and Wheels

Bulletin 48 JS—Jacks and Skids for Mobile Storage

Bulletin 54 DJ—Dairy Industry Trucks

Booklet 53 SR—General Purpose Trucks and Barrel Handling Equipment

Bulletin 53 SC—Trucks for In-Plant Feeding

Bulletin 54-TL—Trucks for Use with Overhead or Under-Floor Powered Conveyors.

63 years of materials handling "know-how" are built into over 1000 models of Nutting Trucks. You benefit by perfect adaptability to the job, easier handling, long life and minimum maintenance. Write for the literature that covers your problem.

NUTTING TRUCK & CASTER CO.
1608 DIVISION ST., FARIBAULT, MINN.

Nutting Since 1891

Export Sales Representative:
SCHEEL INTERNATIONAL, INC.
4237 North Lincoln Ave., Chicago 18, Ill.

Circle No. 122 on Reader Service Card for more information

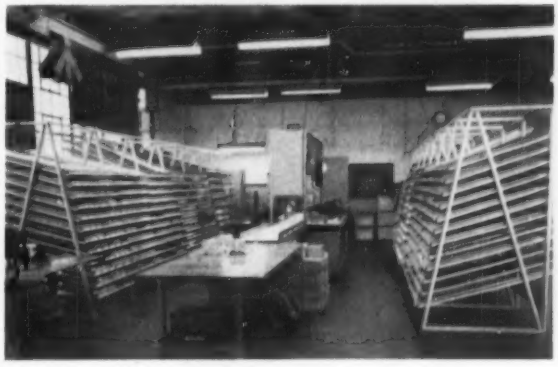
AT JACOBS MANUFACTURING

THE SHORTEST DISTANCE

BETWEEN THESE TWO POINTS
IS

Quik-Pik®

REAR FEED GRAVITY SHELVING



By stocking their entire line of chucks on two parallel banks of Quik-Pik, Jacobs is now able to move orders more quickly and efficiently from reserve to the shipping platform. Picking and restocking operations are segregated and may be carried on simultaneously. Order picker's non-productive walking has been cut. Productivity has increased.

Quik-Pik® cuts costs because . . .

1. Order pickers' non-productive walking is reduced by as much as three-fourths.
2. Items automatically slide into selecting position.
3. Selecting accuracy is increased.
4. Selecting and restocking operations separated.
5. Rotation of stock assured.
6. Inventory taking made easier.

Quik-Pik® can . . .

be applied to order picking of items of many types, shapes, and sizes. Units engineered to suit individual requirements and specifications.

For Additional Information Write

North American Equipment Corporation
250 Vreeland Avenue, Paterson, N. J.

Circle No. 176 on Reader Service Card for more information

Circle No. 141 on Reader Service Card for more information

"KRANE KAR Mobility Is Valuable"

says Jos. Tinellis, Yard Foreman,
LACHOW BROS., INC.
BROOKLYN, N. Y.

"The SILENT HOIST KRANE KAR keeps our crowded yard shipshape," says Mr. Tinellis. "Maneuvers easily, handles loads fast, places them accurately. With lifting clamps or sling chains we move steel shapes, lumber, tanks, scrap. Load and unload trucks. We sort and pile beams, channels, angles up to 7 tons. Also use KRANE KAR on Construction, traveling miles to erection jobs. WE'VE CUT OUR MATERIALS-HANDLING COSTS ABOUT 50%."

Ask about the New Lease-A-KRANE KAR-Plan . . . 1 to 3 Year Lease with Option to Purchase.

Gas or Diesel; 9-37 ft. Booms or Adjustable Telescopic Booms; Pneumatic or Solid Rubber Tires; Electric Magnet; Clamshell Bucket.

Write for Bulletin No. 79B

"Silent Hoist" KRANE KAR Swing-Boom Crane . . . 1½, 2½, 5, 10, 12½ Ton Capacities.

SILENT HOIST & CRANE CO.
Pioneer Mfrs. of Heavy Duty Materials Handling Equipment
888 63rd Street, Brooklyn 20, N. Y.

Lightweight Lifter

Shaw-Box Crane & Hoist Division of Manning, Maxwell & Moore, Inc. has announced a new, lightweight, small, push button controlled electric hoist of the wire rope and drum type. Known as the Series "600" 'Load Lifter' hoists, they are available with lug, upper hook and trolley suspensions, in capacities of 1000 and 2000 pounds. Features pointed out are: aluminum alloy frames with unusual strength and shock resisting qualities; alloy steel heat treated gearing with machine shaved teeth; double brakes; magnetic control; large diameter machine grooved drums; interchangeable suspension and positive upper stop to prevent overtravel of hoist hook.

Circle 221 on Reader Service Card for more information

Streamlined Steel Benches

The Equipto Division of Aurora Equipment Company says the phenomenal popularity of its Modern-Flow steel benches has led it to add 16

New Low Prices on Equipto Iron-Grip* Shelving

"Custom" Quality Unchanged

Expanded plant facilities and advanced machinery and equipment now enable Equipto to reduce prices up to 20% on IRON-GRIP Steel Shelving.

And you get the same outstanding features that IRON-GRIP has always offered—60% faster shelf assembly and adjustment . . . exclusive steel studs eliminate nuts, bolts and tools . . . heavy gauge angled steel uprights . . . channel sided shelves that hold 600 lb load without reinforcement . . . independent construction that prevents moving units intact without disturbing assembly.

See for yourself! Visit your Equipto distributor today!

A slope in the keyhole joins with the taper on the stud to form the tightest and strongest of grips. An exclusive Equipto design.

*T.M. Equipto Division of Aurora Equipment Co. 805 Prairie Ave., Aurora, Illinois
Steel Shelving . . . Parts Bins . . . Drawer Units

Circle No. 20 on Reader Service Card for more information

MAN SAVER

Sweeps up to 400% faster than costly pushbroom cleaning . . . saves money . . . saves manpower

A Parker Floor Sweeper saved $2100 a year for a food manufacturer—$520 a year for a lumber yard—75% of all sweeping costs for a building material manufacturer. *You, too, can save.*

Sweeps all type floors. Collects and sweeps in one operation. Easy to empty. A money-saver for any plant from small garage to large factory or warehouse.

Now available—information file containing time studies, case histories, and full details. *Write, wire, or telephone today.*

FACT FILE AVAILABLE

PARKER INDUSTRIAL FLOOR SWEEPER

PARKER SWEEPER CO., 60 Bechtle Ave., Springfield, Ohio

Circle No. 129 on Reader Service Card for more information

new models to the line. A choice of tops in either 12 gauge steel, masonite covered steel or laminated wood is available. Equipto attributes the outstanding appeal of the streamlined benches to their extra powerful construction and pace-setting advances in design and convenience. They are reputed to support vises without special reinforcement, small punch presses, grinders, drill presses or lathes.

Circle 222 on Reader Service Card for more information

Electric Towing Tractor

Clark Equipment Company has broadened its line of electric-powered material handling equipment with the addition of what is said to be a completely new electric towing tractor. Known as the "Electric Clarkat", the new towing tractor has a normal rated drawbar pull of 600 pounds and is available in two models: the Clarkat-24, with 2400-lb breakaway drawbar pull and the Clarkat-30, with 3000-lb breakaway drawbar pull. Ease of operation, a simple, effective automatic magnetic-controlled electrical system and modern styling are among outstanding features claimed by the manufacturer. The tractor has been designed so that the

move machinery and other heavy loads easily and economically with

the New improved **MULTITON roller skid**

a midget in size...
a giant in strength

- **UNLIMITED carrying capacity.**
- **MAKES TURNS in any direction – even 90° turns**
- **LIGHTWEIGHT**
- **SELF-LAYING TRACK**
- **ONE-PIECE finest alloy steel construction**

Write today for free catalog & specifications
STOKVIS ✡ EDERA & co. inc.
18 Secatoag Ave., Dept. B, Port Washington, N. Y.
Circle No. 193 on Reader Service Card for more information

chip-tote®

Here's a way to cut production costs! The Chip-Tote gives you "hands-off" continuous removal of chips, turnings and borings from high production tools. Automatic machine tools can run continuously without shut-down for scrap removal. Chip-Totes available to fit all standard multiple spindle or automatic machine tools. Write today for catalog No. MF-640 and see the advantages available.

scrap handling

hinged steel belting

Here's a continuous belt conveyor made-up of heavy gauge steel links that are joined by high carbon steel rods. A May-Fran hinged steel belt will gather the turnings and borings from a battery of Chip-Totes or you can use the belt to handle hot, heavy or abrasive castings, forgings, metal blanks, or formed metal parts through production. Write today for No. MF-530 and get full details.

5008-MF

DESIGNERS AND ENGINEERS OF COMPLETE SCRAP HANDLING SYSTEMS

MAY-FRAN ENGINEERING, INC.

1611 CLARKSTONE ROAD • CLEVELAND 12, OHIO
Circle No. 106 on Reader Service Card for more information

Circle No. 41 on Reader Service Card for more information

HANDLING BULK MATERIALS?

"TAKE IT UP A FLO-TUBE"®

CANTON STOKERS

The spiral conveyor of steady, dependable service. Sturdy cast iron trough bolts together in 3 ft. sections, capped with steel plates for easy removal if ever necessary. Built to take the abuse of coal, yet with tolerances just right to handle materials from grain size to lump.

To fill 3 or more hoppers use gate-valves in Flo-Tube horizontally. Below, filling 2 hoppers with "Y" chute.

Hopper level maintained by 'off-on' automatic switches.

Exposed end for pick-up

CANTON STOKER CORP.

SPECIALISTS IN AUTOMATIC COAL FIRING, HANDLING AND CONTROL EQUIPMENT

108 ANDREW PLACE S. W. • CANTON, OHIO

operator is seated in the rear, operates automotive-type controls and has easy access to the coupler control. The chassis design enables the driver to mount and dismount the vehicle with minimum effort.

Circle 223 on Reader Service Card for more information

Improved Hand Truck

A vastly improved hand truck has been announced by Nutting Truck and Caster Company. The improvement, embodied in the glides, is said to provide easier, safer and better balanced traversal up and down curbs or stairs. Rather than the intermittent raising and lowering of the load as with conventional glides, the new glides permit a smooth slide in a position approximately parallel to the slope of the curbs or stairs.

Frame size is 14x47 inches high; open or solid plate noses are available in 5, 7 or 9 inch lengths; and a choice of 6 or 10 inch wheels.

Circle 224 on Reader Service Card for more information

Flowstrut Builds Files for Record Storage

Table or trestle . . . workbench or warehouse . . .

BOLT it together swiftly, simply, economically

FLOWSTRUT

WORLD PATENTS PENDING

UNIVERSAL SLOTTED ANGLE SYSTEM

STANDARD EQUIPMENT FOR YOUR INDIVIDUAL BUILDING NEEDS

BUILD DIRECTLY FROM YOUR ROUGH SKETCH —WITH ONLY A WRENCH AND A CUTTER! 40 pre-drilled bolt holes per foot; cutting marks at ½" intervals eliminate detailed drawings and tedious measurements. Flowstrut needs no finishing; Bonderized baked gray enamel finish is weather- and rust-proof.

Strong and sturdy Flowstrut-built units are completely salvageable! Expand or dismantle as requirements vary; Flowstrut stores compactly.

Write for Detailed Bulletin Today

Distributor's Inquiries Invited

FLOWSTRUT CORPORATION

135 East 44th St., New York 17, N. Y.

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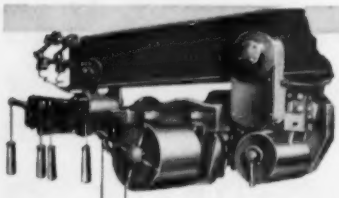


move it overhead with

ELECTROLIFT

Materials will move faster and with less waste motion when you move them over crowded aisles with ElectroLift worm drive hoists. Any ElectroLift will quickly pay for itself in savings in time, power, labor and reduced accidents.

Built for long, profitable and trouble-free service, the ElectroLift hoist is available in a wide variety of models up to 6 tons capacity with optional pushbutton control.

Get all the facts on ElectroLift by contacting your ElectroLift representative listed in your telephone directory.

ElectroLift, Inc.

204 Sargeant Avenue, Clifton, N. J.

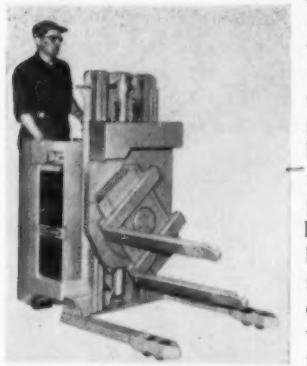
2170

ELECTROLIFT

Circle No. 65 on Reader Service Card for more information

Special Rider Truck

The Raymond Corporation has announced a rider type fork truck for narrow aisle operation equipped with special hook type revolving forks. The truck is driven up to the production machine, the fork hooks engage the tote box handles and pull out the box. The hooks are disengaged by lowering the forks which are then driven into channels welded on the bottom of the tote boxes and elevated for traveling. When the truck arrives at the centrifuge machine, the forks revolve, dumping the turnings. Savings in labor, better housekeeping, a faster, neater and less costly operation are claimed by the manufacturer.



Circle 225 on Reader Service Card for more information

Worker Rides Stationary Lift

The Electraulic Stationary Liftable developed by Service Caster & Truck Corporation allows the operator to ride with the deck and feed sheets or molds into varying levels. Wired for 550 volt,

"UNDER-SIDE" DESIGN MAKES THE DIFFERENCE

Only in Bronco Magnesium Bridge Ramps do you get the exclusive "Under-Side" construction design that gives you greater strength, longer life with a minimum of weight. Bronco's "Under-Side" design is only one of the reasons why the 12,000 lb. capacity bridge ramp illustrated above is doing an outstanding job reducing materials handling costs at Alexander's Market Warehouse, Glendale, California.

Write today for complete information on all the features of Bronco Bridge Ramps.

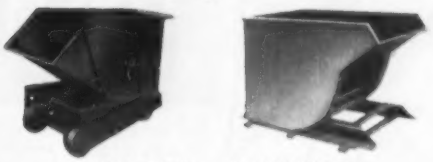
- ★ Low initial cost — lifetime service
- ★ Maximum strength — minimum weight
- ★ Safety tread surface for full traction
- ★ Positive, adjustable locking device
- ★ Side guards designed to prevent tire damage or equipment run-off
- ★ Carloading or Truck Ramps — capacities from 1000 to 12,000 lbs.

BRONCO Magnesium BRIDGE RAMPS

BRONCO PRODUCTS COMPANY
717 Stanford Ave.
Los Angeles 21, Calif.

Circle No. 139 on Reader Service Card for more information

Write for bulletins on this rugged money-saving materials-handling equipment



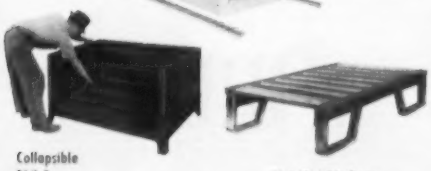
Phil-Dump Junior Bulletin E-1A

Model F-1 Phil-Dump Bulletin E-1S

Model R-1½ Phil-Dump Trailer Bulletin E-9A

Side-Dump Phil-Trailer Bulletin E-39

Motorized Transfer Car Bulletin E-51



Collapsible Phil-Box Bulletin E-14

Phil-Skid Platform Bulletin E-5A

80,000 pound-capacity Phil-Trailer with Articulated Axles Bulletin E-35A

Phillips equipment has proved its merit in thousands of applications everywhere. Ruggedly built and well designed, it withstands hard usage for longer periods. You'll profit by having Phillips literature on file

Phillips CORPORATION

(formerly Phillips Mine & Mill Supply Co.)
Manufacturers Since 1863
13 Arch Street, Carnegie, Pa.

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Circle No. 59 on Reader Service Card for more information

for ruggedness and simplicity, long life and low maintenance. A real material handling cost saver. Available in various suspensions and speeds; in capacities 1000 to 6000 lbs.

Ask for Bulletin 668

DETROIT HOIST & MACHINE CO.
48th year—Designers & Manufacturers of Hoists and Cranes
8249 Morrow St. • Detroit 11, Mich.

3 phase, 60 cycle power with 110 volt control circuit of "deadman" raise and lower type mounted near the operator's hand, the lift is available with explosion proof equipment. Increment controls of the automatic types may be secured. The platform is 36 inches wide x 48 inches long. The unit's lowered height is 40 inches and its raised height 70 inches.

Circle 226 on Reader Service Card for more information

Economical Gas Truck

Two additions have been made to the line of gas powered fork trucks manufactured by The Baker-Raulang Company. Called the FD 50 and FD 60, the trucks are designed to speed the handling of materials in manufacturing plants, warehouses and rugged outdoor terrain. According to Baker-Raulang, the FD 50 rated for loads up to 5000 pounds and the FD 60 rated for loads up to 6000 pounds, can do a day's work on less than 5 gallons of gas per day. Unique electric transmission

OHIO
Industrial Trucks & Trailers

NO. 1001 Capacity 20000 lbs.

Size 48" wide x 96" long x 22" high. All welded steel construction with Pressed-On Rubber Tires and Plate Steel Deck. An all purpose heavy duty industrial trailer.

Various Platform Sizes may be furnished.

Heavy Duty Trucks and Trailers to YOUR Specifications. Write for Detailed Information.

THE OHIO GALVANIZING & MFG. CO.
NILES Established 1902 OHIO

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New Bond S-L-U* DRUM TRUCK ... for faster, easier handling

- Spring action chime hook.
- Floating axle with rolling motion.
- Rugged all steel welded construction.
- Two wheel types: vulcanized-on rubber tread or semi-steel.
- Rests in tilted position for maximum drainage.
- Stands upright for safe storage.

The *new* Bond *Self-Loading and Unloading Drum Truck takes "the work" out of lifting, moving and draining either drums or barrels . . . and speeds the job at that! Like every hand truck in the full Bond line, this drum truck is designed and built to give extra service, extra satisfaction!

Write today for your copy of Bond Bulletin R-61 . . . it gives all the facts on the new Bond Drum Truck.

BOND FOUNDRY & MACHINE COMPANY
Manheim, Pennsylvania

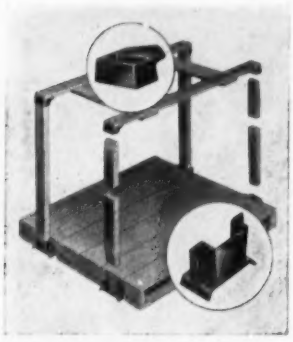
Circle No. 32 on Reader Service Card for more information

is said to make this economy possible. Important new design features incorporated in both trucks include a worm-gear driven power axle which delivers high efficiency under heavy loads when maximum power is needed, and an inching control which permits high speed hoisting at low travel speeds.

Circle 227 on Reader Service Card for more information

Easily Self-Assembled

The new "V" socket type hardware which permits users to build their own stacking pallets is announced by The Paltier Corporation. It assembles to any standard pallet, and is said to be safe, flexible and inexpensive. Each pallet with "V" socket hardware and 2 x 4 inch uprights is designed to carry a load of 1500 pounds safely in a tier of three high, or a total of 4500 pounds with 48 inch posts. Additional load capacity can be attained by using 3 x 4s. The hardware can also be adapted to shelving, bins and knocked-down boxes.



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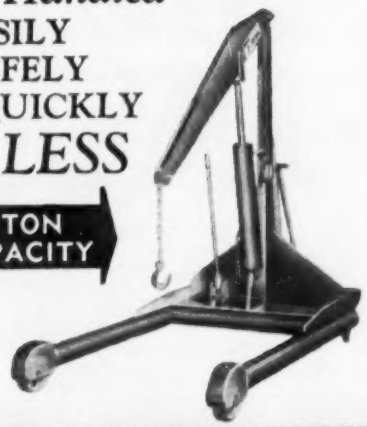
BULKY, AWKWARD, HEAVY LOADS

Handled

· EASILY
· SAFELY
· QUICKLY

for LESS

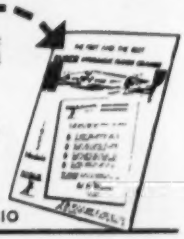
2 TON CAPACITY



SUBSTITUTE FOR AN ELEPHANT

GET THIS BOOK

Gives all the facts about Ruger's complete line of hydraulic floor and truck mounted cranes, capacities 1000 to 6000 lbs.



RUGER CRANES

401 West Fourth St. UHRICHSVILLE, OHIO

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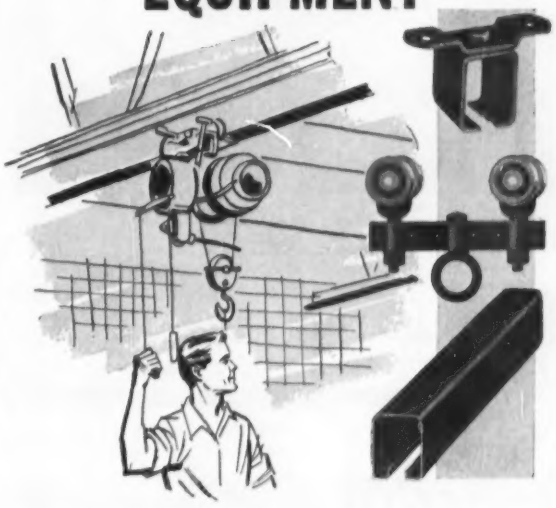
NO "Big Deal"

when you install

COBURN

OVERHEAD CONVEYING EQUIPMENT



Your own men can do it . . . and save you money. Here are the simple ABC's of Coburn's easy and inexpensive installation.

A. Our engineers make a study of your particular plant layout.

B. Easy-to-follow plans then are submitted.

C. These plans, plus Coburn's simplicity of parts and design enable your own plant personnel to set up your overhead conveying system quickly and economically.

Re-arrangement or extension of your system can be made at any time because of the sectional design of Coburn Overhead Monorail. Coburn Conveying Equipment pays for itself many times over in greater labor efficiency, reduced product damage, and faster handling of materials. Write for Catalog #220 to Coburn Sales and Engineering, 56 Sterling Street, Clinton, Mass.

2578

COBURN PRODUCTS

PRODUCT OF WICKWIRE SPENCER STEEL DIVISION THE COLORADO FUEL AND IRON CORPORATION CF&I

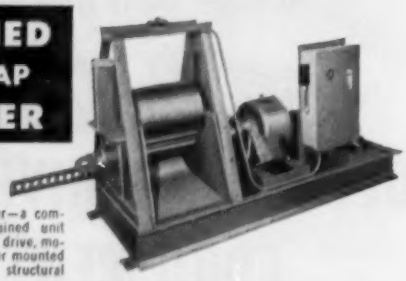
Circle No. 50 on Reader Service Card for more information

Circle No. 4 on Reader Service Card for more information

MAKES BALES

of strip shearings — stringy scrap

ALLIED SCRAP BALER



The Allied Baler—a complete, self-contained unit including geared drive, motor and controller mounted on a portable, structural steel base.

Lead-in piece is hooked to winding spindle. Tangled mass is dragged in.

Bale partly formed. Compacting roller and contour of baling box form dense uniform bales.

Full bale completed; 19" dia., 19" lg., approx. 400 lbs. ready for sale.

Write for further information.

Allied Steel and Conveyors, Inc.

17309 Healy Ave. • Detroit 12, Mich.

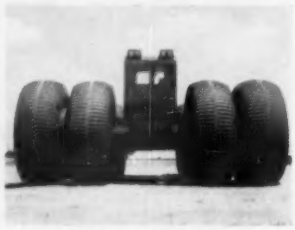
Fast, Easy Stacking

A new type stacking bin, Style 900D, has been designed by Bay Products, Inc. for easy, fast handling of small parts. Featured are: reinforced corners, drop handle back of bin, spot-welded construction, four rivets for extra strength, continuous stacking rim on all four sides. It nests nicely with Style 800D stacking box of the same length and width.

Circle 229 on Reader Service Card for more information

Electrically Powered Sno-Buggy

The world's largest rubber tires are ready to roll by electric power over snow, swamp or desert, according to R. G. LeTourneau, which has engineered the mammoth pneumatics onto its Sno-Buggy. The first model of the gigantic exploratory vehicle and prime mover is on its way to the North country for test as a



WEIGH MATERIALS ON THE SPOT!

With the DILLON Weight Indicator, loads are checked on the spot *as they are moved*—the instant they are lifted. No need to pick materials up, move them to a scale, set them down and then pick them up again—no more *double* handling or high operational costs.

Accuracy is guaranteed to be within ONE division or less at any point on the dial. Adjustable for large tare loads. 16" dia. dial. Swivel hook. Accidental overload and shock protected. 8 capacities from 0-250 pounds up to 0-20,000 pounds. Portable—weather-proof—dust-proof. Each unit calibrated with certified dead weights. Extreme utility at LOW cost!

Write today for illustrated, descriptive literature.

W. C. DILLON & CO., INC.

14620-Q Keswick St., Van Nuys, (suburb of Los Angeles) Calif.

Circle No. 61 on Reader Service Card for more information

JAKES

America's Finest Industrial Trucks and Trailers

Model TT-10, "SAFE-TOW" conveyor truck for floor type conveyor, also available for overhead type conveyor. Low deck height 7-1/2", 6" rubber wheels, either molded-on type or demountable. Sealed ball bearings and sealed casters. Write for specification sheet.

JAKES FOUNDRY COMPANY

Established 1891

2800 Charlotte Avenue Nashville 9, Tennessee

Circle No. 93 on Reader Service Card for more information

trail blazer through deep, soft powdery snow. Eight of the ten foot high, four foot wide tires are mounted dual-fashion on the electrically powered and controlled machine.

Circle 230 on Reader Service Card for more information

Lightweight Gravity Rollers

Two new types of lightweight gravity roller conveyor have been added to the Arrow Products line. The Arr-O-Roll, Jr. is of all steel construction, while the Arr-O-Rolite has an aluminum frame with steel rollers. Straight sections are available in five and ten foot lengths, and in 12 and 18 inch widths. Curves are four foot radius, 45 and 90 degree angle. Rollers are one-and-one-half inch diameter, with closed type grease packed bearings. The units were designed for applications where a strong, lightweight, portable conveyor is required.

Circle 231 on Reader Service Card for more information

Automatic Doors

Doors that speed up the flow of men and materials by opening automatically and closing when

BETTER PERFORMANCE
LONGER SERVICE

HOBBS Engine Hour METERS

New and improved through continuing engineering research

Your lift trucks and other powered materials handling equipment last longer and require fewer repairs when a definite program of protective maintenance is followed. TIMELY care prevents major repair . . . HOBBS HOUR METERS tell you WHEN it's time to lubricate, change oil, overhaul, etc.

NOT A REVOLUTION COUNTER

It's an electrical timing instrument that shows HOURS and MINUTES of any engine operation. Provides the accuracy that's important for genuinely effective protective maintenance.

APPROVED BY LEADING MANUFACTURERS

Installed as original equipment or recommended as an approved accessory by leading makers of materials handling equipment. Ruggedly built . . . easy to install . . . low in price. See your factory branch, representative or distributor . . . or WRITE:

ORIGINATED AND MANUFACTURED EXCLUSIVELY BY
John W. Hobbs Corporation
2061 YALE BLVD. SPRINGFIELD, ILLINOIS

Circle No. 88 on Reader Service Card for more information

CESCO'S
TOTE-SHOP BOXES

DO YOUR ROUGH/TOUGH JOB
EFFICIENTLY • EASILY • ECONOMICALLY
on Conveyors • Pallets • Hand Trucks
Skid Platforms • or what have you

RUGGED CONSTRUCTION • PRIME MATERIALS

Model #WB (Wood Bottom)

Stock sizes will accommodate loads up to 200 Lbs., possibly greater, depending upon material packed and handling method.

MODEL WB

STANDARD SIZES AVAILABLE FROM STOCK
(Prices net — F. O. B. Northhampton, Mass.)

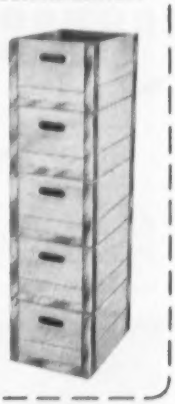
Lots of	WB-1	WB-2	WB-3
2000	$1.96	$2.14	$2.28
1000	1.99	2.17	2.31
500	2.02	2.20	2.34
250	2.07	2.25	2.39
100	2.12	2.30	2.44

Model	Size	Length	Width	Depth	Weight
WB-1	I. D.	14⅞"	11¾"	9"	11¼ lbs.
WB-2	I. D.	18"	11¾"	9"	13 lbs.
WB-3	I. D.	20"	11¾"	9"	14 lbs.

SPECIAL APPLICATION
MB — (Metal Bottom) FLAT

Standard Sizes in Stock — Write for information.

STACK SECURELY... CONVENIENTLY!



Write today for quotations on special sizes . . . Facilities available for special markings in various colors and numbers for identification purposes. Please submit detailed specifications.

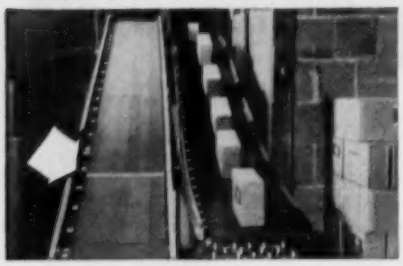
CESCO CONTAINER CO.
General Offices: 475 Fifth Ave., New York 17, N. Y.
Factory: NORTHAMPTON, MASS

Circle No. 185 on Reader Service Card for more information

Circle No. 72 on Reader Service Card for more information

ALLIGATOR®

CONVEYOR BELT LACING



Every Tooth A Vise*

in Long Continuous Lengths for Conveyor Belts . . . . .

- ★ Excellent for Package Conveyors, Portable Loaders, Trenching and Ditching Machines, etc.
- ★ In canneries where corrosion or rust is a problem specify Alligator made of Stainless or Monel.
- ★ For magnetic separators or anti-sparking specify Alligator made of Everdur.
- ★ Separable and smooth on both sides.
- ★ 12 sizes. For belts from 1/16" to 5/8" thick—and *any width*.

Order from Your Supply House. Ask for Bulletin A-60.

FLEXIBLE STEEL LACING CO. 4702 Lexington St., Chicago 44, Ill.

JUST A HAMMER TO APPLY IT

Moving or Storing is Rapid, Convenient and Inexpensive with

IRONBOUND SEMI-LIVE SKID PLATFORMS

Ruggedly built with capacities up to 2500 lbs. These units are quickly made mobile with the use of low cost lift jacks . . . One of the methods that Ironbound engineers use to increase production and conserve space at low cost.

SEMI-LIVE SKID WITH BOX TOP

. . . permanently attached or removable. Also available with many other superstructures to "Short-Haul" your products thru production or into storage. Useful in hundreds of spots in every plant.

THE IRONBOUND "SAFETY-SKID" WITH ROUND CORNERS

Ironbound construction assures long hard use with complete safety to product and operator. Still the time proven method for handling of materials efficiently and economically.

IRONBOUND

BOX & LUMBER COMPANY

Materials Handling Division

30 HOFFMAN PLACE • HILLSIDE, N. J.

MANUFACTURERS OF QUALITY BUILT SKIDS, SEMI-LIVE SKIDS, FLOOR TRUCKS, ROLL TRUCKS, DOLLIES AND PRY BARS

Circle No. 92 on Reader Service Card for more information

the passage is clear, manufactured by The Stanley Works, Magic Door Division, have been given the name "Magic Doors". They are said to cut down on heating and maintenance costs. Doors that swing, slide or fold can be opened by a photoelectric device (the Stanley Magic Eye), or by pull cords, push buttons or floor plates. Any of the controls will open the door for a predetermined interval and close it when the traffic has cleared, without a hand or truck touching the door.

Circle 232 on Reader Service Card for more information

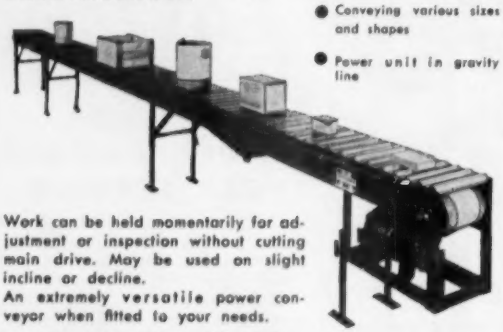
Heavy Duty Fork Truck

Designed to meet industrial needs for a heavy duty pneumatic-tired fork truck, the Clark-Ross Y-200, a 20,000 pound at 24 inch load center machine, is now available in the regular line of fork trucks manufactured by Clark Equipment Company. The Y-200 was designed and constructed specifically for the heavy-duty applications encountered in construction, steel, concrete, lumber and logging and other industries, according to the manufacturer. The machine is hydraulically controlled throughout, including lift, tilt, power

METZGAR LIVE-ROLLER CONVEYOR

Specifically Recommended for

- Moving sharp-cornered and rough-edged items
- Conveying various sizes and shapes
- Power unit in gravity line



Work can be held momentarily for adjustment or inspection without cutting main drive. May be used on slight incline or decline.

An extremely versatile power conveyor when fitted to your needs.

Standard widths: 11½" — 15" — 18" — 24". Length to suit. Conveyors up to 30' are powered by a 110 V. single phase gearhead A.C. or D.C. motor; longer units, 220/440 three phase A.C. or D.C. Roller spacing as required. Factory lubricated for life.

Our engineers can help you most when you explain your requirements fully. Ask for Bulletin J-1.

- Production-line work movement
- Handling heated and heat-treated items

METZGAR CONVEYOR CO.

423 Douglas St. N. W.

MFRS. OF WHEEL & ROLLER GRAVITY & LIVE ROLLER CONVEYORS • POWER BELT CONVEYORS • SWITCHES • ACCESSORIES & REEL DOLLIES

GRAND RAPIDS 4, MICH.

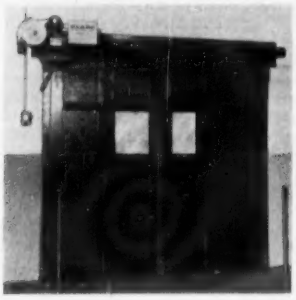
Circle No. 109 on Reader Service Card for more information

steering and power braking, and all main hydraulic units are in a separate compartment directly accessible through hinged panels.

Circle 233 on Reader Service Card for more information

Continuous Door Service

A new type of frictionless hinge, especially designed for use with Prest-O-Matic Automatic Doors, has been announced by Clark Door Company, Inc. It is of extra heavy construction, made to render continuous service under rigorous industrial conditions, where lubrication may often be neglected. The hinges have a load factor in excess of 15 to 1, and are supported on 5/8 inch pentel shafts running through 3x14 inch specially designed hinge leaves.



Circle 234 on Reader Service Card for more information

Your Inquiries Get Immediate Attention!
Use The Reader Service Card Bound Into This Issue.

Circle No. 108 on Reader Service Card for more information

COURSES IN MATERIALS HANDLING

AT THE SCHOOL OF MATERIALS HANDLING
IN THE BEAUTIFUL COUNTRYSIDE OF KENT, ENGLAND
FOR ALL LEVELS OF MANAGEMENT AND FOR PRIVATE STUDENTS

Come and spend a few weeks with us and study, both in theory and practice, this important subject. The fees are fully inclusive covering full tuition, first-class accommodation and cuisine, club membership and extensive recreational facilities.

12 Week Residential Course—Work Study and Materials Handling	$1200
6 Week Residential Course—Materials Handling	$ 650
6 Week Residential Course—Work Study and Materials Handling	$ 650
3 Week Residential Course—Materials Handling	$ 350
2 Week Residential Course—Materials Handling	$ 250

WRITE FOR FULLY ILLUSTRATED BROCHURES WITHOUT DELAY TO: **THE REGISTRAR, SCHOOL OF MATERIALS HANDLING, DIVISION OF THE COLLEGE OF PRODUCTION TECHNOLOGY, SWINFORD OLD MANOR, NR. ASHFORD, KENT, ENGLAND**

Circle No. 184 on Reader Service Card for more information

CLASSIFIED ADVERTISING SECTION

USED EQUIPMENT—MEN—JOBS—LINES

Rates: for "Positions Wanted" $8.00 minimum, limit 25 words. For all other classifications $10.00 minimum for 25 words; each additional word 25c. Boldface type or all caps, $12.00 minimum for 25 words, each additional word 35c. Box address counts as five words. All insertions payable in advance.

FOR SALE

FOR SALE OR LEASE—Baker CXB 6,000 Lb. Capacity Crane Truck. Ready-Power. Factory-Rebuilt. 90-Day Warranty. $6,000 FOB Cincinnati or Reasonable Rental. **M. W. McMillan Company, 7654 Montgomery Road, Cincinnati 36, Ohio.**

CONVEYOR—Still erected in Eastern Ohio Brewery as last used: 5 power belt conveyors, 75' long, with separate motor drives. 150' gravity roller conveyor, 2" dia. rollers on 4" centers, with stands and curves, can be inspected and shipped immediately; a real bargain. Write c/o FLOW, Box 10254.

CONVEYOR—Approx. 275' used gravity conveyor, aluminum construction, 5- and 10-foot sections, practically brand new, immediate delivery, West Coast shipping point. Write c/o FLOW, Box 10554.

LABELERS—2 Ermold 8-wide labelers in 10-wide frame. Write c/o FLOW, Box 10454.

PACKER—Standard Knapp case packer for 12 and 32-oz. bottles, completely rebuilt. Write c/o FLOW, Box 10354.

HELP WANTED

Estimator with package conveyor or power transmission, light structural and sheet metal experience. Good opportunity with growing Chicago concern. Answer fully, stating age, experience, salary requirement. Write c/o FLOW Box 10754.

REPRESENTATIVES WANTED

MANUFACTURERS AGENT! Prominent manufacturer of famous make BRUSH PEN seeks aggressive Mfgrs. Agents calling on Wholesalers, Jobbers, and Distributors to expand sales of their fast selling, time proven, amazing Brush pen that writes on practically all surfaces. Prefer organization with successful record in sales of non-conflicting allied lines. All replies confidential. Lockwood Co., 366C Boston Post Road, Milford, Conn.

LINES WANTED

Experienced, aggressive free-lance materials handling salesman wants several lines on exclusive basis for greater Chicago area. Commission basis only. Write c/o FLOW, Box 10654.

POSITIONS WANTED

Sales Engineer—Materials Handling or Packaging. Age 28, single, BIE, four years experience Industrial Engineer, emphasis on Materials Handling and Packaging. Desires technical sales position with manufacturer or distributor. Sales experience limited but applicant has high sales aptitude. Results of Psychological Analysis available. Will relocate. Write c/o FLOW Box 10854.

Sales Engineer with proven record of eleven years material handling experience in Chicago and vicinity seeks agency or direct representation. Write c/o FLOW, Box 10154.

JOB HUNTING?
Here's a new FLOW service to aid those who hesitate to answer "blind" advertisements in our Help Wanted column. Rather than jeopardize your present job by having your letter fall into the hands of your own employer or some other unwanted firm, just send FLOW a list of the "taboo" firms along with your letter. If the advertiser is on your list your letter will be returned to you.

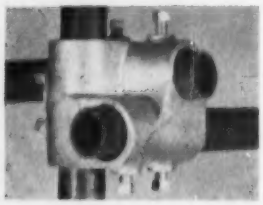
Make Your Own

STORAGE RACKS

With

AMIDON FITTINGS

AND YOUR OWN PIPE



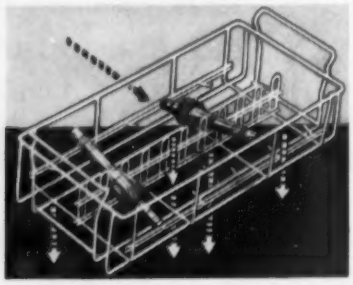
Strong • Economical • Adjustable

Write for further details

AMIDON ENGINEERING CO.
ELYRIA 9, OHIO

Circle No. 23 on Reader Service Card for more information

This "Carryer" paid for itself 200 times



...and still in service!

This "Carryer" handles automatic transmission splined shafts—carefully suspending the parts throughout processing. Each month it more than pays for itself in reduction of scrap or re-work, and elimination of non-productive transfer in and out of cleaning. It has been in service 10 years—will probably go 10 more with little maintenance. That's why every automatic transmission plant uses "Carryers". Whatever your parts, "Carryers" can do the same for you. Easy handling manually, by hand truck, on pallets, or conveyors. Accommodate 50%-300% more parts per square foot of floor area than any other method. They're also available for bulk handling.

this free brochure may help you.

MID-WEST

MID-WEST WIRE PRODUCTS CO., INC.
27 Years of Parts Handling Experience
FENKELL DETROIT 21, MICH.

Circle No. 112 on Reader Service Card for more information

Advertisers' Index

A

Abell-Howe Co. 106
Ainsworth Mfg. Corp. 4
Albion Industries 126
Allied Steel & Conveyors, Inc. 188
Allis-Chalmers Mfg. Co. 107
Alvey Conveyor Mfg. Co. 112
American Box Co. 156
American Chain & Cable Co.
Wright Hoist Div. 62
American Chain & Cable Co.
American Chain Div. 63
American Machine & Foundry Co. 125
American Metal Products Co. 54
American MonoRail Co. 18
American Sisalkraft Co. 166
American Tape Printer Co. 160
Amidon Engineering Co. 192
Angier Corp. 159
Appleton Electric Co. 60
Arkansas Pallet Co. 178
Aro Equipment Corp. 53
Arrow Products Co. 177
Artko Corporation 176
Ashworth Bros. Inc. 179
Atlas Industries, Inc. 173
Aurora Equipment Co. 182
Autoette, Inc. 67
Automatic Transportation Co. 3

B

Baker-Raulang Co. 29, 49
Baldwin-Lima-Hamilton Co. 43
Barber-Greene Co. 171
Bassick Co. 99
Baughman Mfg. Co. 66 & 67
Bay City Shovels, Inc. 101
Belt Corporation 176
Better Packages, Inc. 167
Big Joe Mfg. Co. 6
Bond Foundry & Machine Co. 186
Bostitch Inc. 155
Bowers Battery & Spark Plug Co. 176
Brainard Steel Div. Sharon Steel Corp. 143
Bronco Products Co. 185
Brooks & Perkins, Inc. 108
Buda Co. 122
Buffalo Weaving & Belting Co. 102
E. W. Buschman Co. 126

C

E. J. Cady & Co. 179
Cambridge Wire Cloth Co. 58
Canton Stoker Corp. 184
CAPCO 170
Cesco Container Co. 189
Wm. Christensen Co. Inc. 174
Clark Door Co. 176
Clark Equipment Co. 15, 109
Clipper Belt Lacer Co. 178
Coffing-Hoist Co. 110
Coles Cranes, Inc. 104
College of Production Techniques 191
Colorado Fuel & Iron Corp. 187
Colson Corp. 39
Colson Equipment & Supply Co. 117
Conveyor Specialty Co. Inc. 175
Counsel Machine Co. 194
Cullen-Friestedt Co. 175
Cushman Motor Works 172

D

Darnell Corp. Ltd. 177
Dempster Bros. Inc. 52
Derby Sealers, Inc. 170
Detroit Hoist & Machine Co. 186
Diamond Chain Co. 35
Dico Co. 120
W. C. Dillon & Co. 188
Chas. Wm. Doepke Mfg. Co. 103

E

Thos. A. Edison, Inc. 115
Electric Storage Battery Co. 55
Electrolift, Inc. 184
Elwell-Parker Electric Co. 9
Euclid Crane & Hoist Co. 124

F

Fairbanks, Morse & Co. 14
A. B. Farquhar Div. The Oliver Corp. 123
Fibre Specialty Div.
National Vulcanized Fibre Co. 25
Field Engineering Products Co. 118
Dave Fischbein Co. 166
Flexible Steel Lacing Co. 190
Flowstrut Corp. 184
Bernard Franklin Co. 174
Fried Steel, Inc. 170

G

Robt. Gair Co. Inc. 151
Gaylord Container Corp. 154
General Box Co. 139
General Electric Co. 31
Gerlinger Carrier Co. 41
Gerrard Steel Strapping Co. 128
Globe Woven Belting Co., Inc. 32
B. F. Goodrich Co. 105
Goodyear Tire & Rubber Co. 1
Adolph Gottscho, Inc. 167
Gould National Batteries, Inc. 70

H

Harnischfeger Corp. 45
Heppenstall Co. 8
Hercules Motors Corp. 46
Karl A. Herman Co. 178
John W. Hobbs Corp. 189
Frank G. Hough Co. 57
Hudson Pulp & Paper Co. 145
Hyster Co. 33

I

Ironbound Box & Lumber Co. 190

J

Jaeger Machine Co. 61
Jakes Foundry Co. 188

K

Kalamazoo Tank & Silo Co. 173
Keller Tool Co. 38
Kimberly-Clark Corp. 133

L

Lewis-Shepard Prods. Inc. 65
Lift Trucks, Inc. 100
Loomis Machine Co. 48
Louden Machinery Co. 21

M

M-H Standard Co. 174
Madesco Tackle Block Co. 179
Magline, Inc. Inside Back Cover
Magnesium Co. of America 121
Market Forge Co. 171
May-Fran Engineering Co. 183
Mercury Mfg. Co. 111
Merrill Bros. 191
Metzger Conveyor Co. 190
Michigan Crane & Conveyor Co. 50
Mid-States Gummed Paper Co. 168
Mid-West Wire Products Co. 192
Minneapolis-Moline Co. 113
Minnesota Mining & Mfg. Co. 131
Mixermobile Dist. 116
Moto-Truc Co. 44
Multistamp Co. 168

N

Neff & Fry Co. 194
Neiman Steel Equipment Co. Inc. 172
New London Engineering Co. 173
North American Equipment Corp. 181
Nichols Paper Products Co. 169
Nolan Co. 175
Nutting Truck & Caster Co. 181

O

Ohio Galvanizing & Mfg. Co. 186
Oliver Corp. 34
Omic, Ltd. 28
Orangeville Mfg. Co. 124
Otis Elevator Co. 26 & 27

P

Pak-Rapid Inc. 165
Palmer-Shile Co. 98
Parker Sweeper Co. 182
Phillips Corp. 185
Pittsburgh Steel Prod. Co. 68 & 69

R

Rack Engineering Co. 180
Rapids-Standard Co. 11
Raymond Corp. 22 & 23
Revolvator Co. 122
Richardson Scale Co. 118
C. E. Robinson Co. 171
Roura Iron Works 58
Ruger Equipment Co. 187

S

Sackner Products 165
Service Recorder Co. 127
Signode Steel Strapping Co. 158
Silent Hoist & Crane Co. 182
Standard Conveyor Co. 119
Stanley Works, The 12, 161
Sterling Wheelbarrow Co. 122
Stokvis Edera & Co. Inc. 183
Swing-Shift Co. 172

T

G. H. Tennant Co. 10
Thermoid Co. 162
Thew Shovel Co. 47
Thomas Truck & Caster Co. 17
Towmotor Corp. 93
Tractomotive Corp. 19

U

Union Special Machine Co. 169
Union Steel Products Co. 36 & 37
Unistrut Prods. Co. 13
Unit Crane & Shovel Corp. 30
United States Rubber Co. 96 & 97

V

Vickers, Inc. 157

W

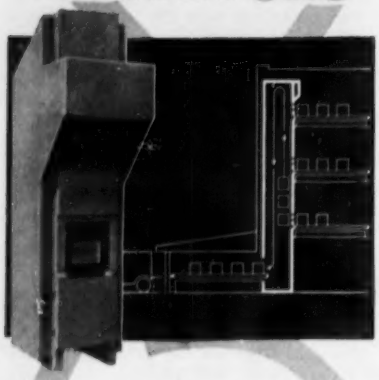
John Waldron Corp. 64
Wayne Pump Co. 95
Jervis B. Webb Co. 59
Weber Addressing Machine Co. 169
Westinghouse Air Brake Co.
Inside Front Cover
Whiting Corporation 5
Wirebound Box Mfrs. Assn. 164
Wisconsin Motor Corp. 120
Wise Engineering Co. 2
Wright Hoist Div.,
American Chain & Cable Co. 62

Y

Yale & Towne Mfg. Co. 51
Youngstown Steel Door Co. 16

here's one job you can do with

ROBO-LIFT ELEVATING TRAY CONVEYORS



Hard-to-manage multi-story handling jobs are simplified—costly hand operations are reduced—and rough handling damage and waste are eliminated—when you install a Robo-Lift on your production line. That's because Robo-Lift provides:

- Vertical or near-vertical elevating or lowering
- Horizontally maintained trays
- Vertical-to-horizontal or horizontal-to-vertical changes without transfer.
- Pick-up and discharge at various selected levels
- Accommodation of various sizes in one unit
- Minimum clearance and space requirements
- Manual or automatic in-feed
- Useful space expansion

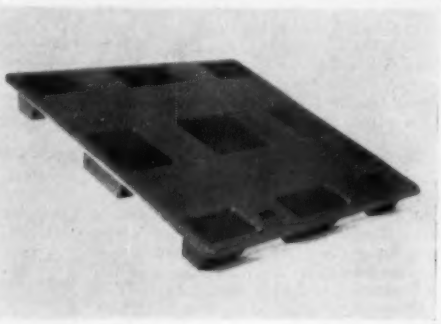
Robo-Lift's many desirable advantages undoubtedly suggest uses in your operation. Please request details and specifications on your letterhead.

Counsel
MACHINE COMPANY INC
8 HATHAWAY ST.
WALLINGTON, N. J.

Circle No. 53 on Reader Service Card

Plastic Pallet? Here It Is!

A fiberglass, reinforced plastic pallet, which may be ordered in a variety of colors and is said to have an exceptional strength-weight ratio, is making news in the industry. The pallet, manufactured by Firmaline Products, Inc., weighs only 28 pounds, yet will carry live loads of 3000 pounds and static loads of 12,000 pounds, with wide margins of safety. The first model released is a 40x48 inch, 4-way design with nine legs, affording maximum load bearing area. The leg design permits easy nesting, and a stack of 100 pallets reaches a height of only 92 inches. Constructed of a combination of glass fiber and polyester resin, the pallet is said to be excellent where sanitation is an important factor, as it is easily cleaned. An interesting feature is the use of many different bright colors, which aid in easy coding or selection of similarly packaged materials.



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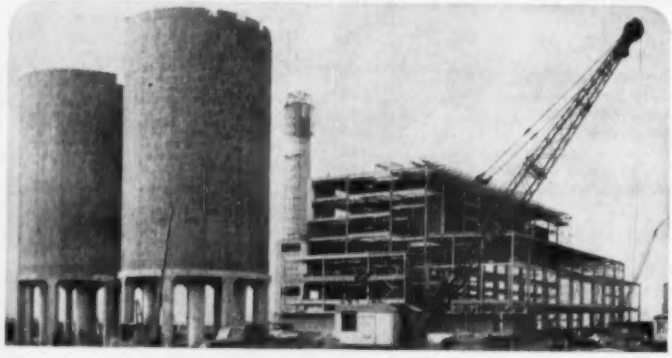


2 big N. & F. coal bins at Dow Chemical

These 36' x 60' Neff & Fry bins for boiler-room coal have been in use for six years although the photograph was taken at the time of construction. They are located at the Midland, Mich., plant of Dow Chemical Co.

We are proud to have erected bins for many prominent North American firms. The bins are used for handling ashes, ore, coal, grain, sand, clay, minerals, stone, wood chips, and scores of other flowable bulk materials.

Our bins are often termed silos or tanks. Their advantages are explained in a folder entitled, "Bins With the Strength of Pillars." Ask for it and read it. Then talk to users. We'll be glad to give you the names of the nearest ones.

Write, wire, or phone us now while the subject is on your mind.

The Neff & Fry Co.
110 Elm St. • Camden, Ohio

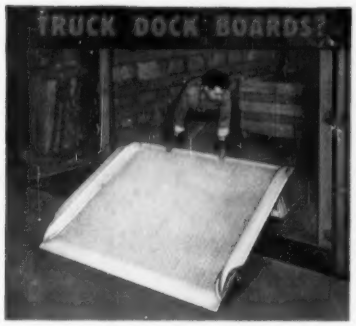
Not exported except to Canada and Mexico

NEFF & FRY SUPER-CONCRETE STAVE STORAGE BINS

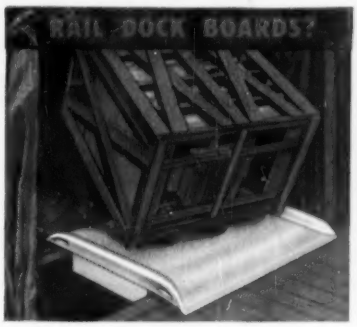
Circle No. 118 on Reader Service Card for more information

WHICH MAGLINER DOCK BOARD

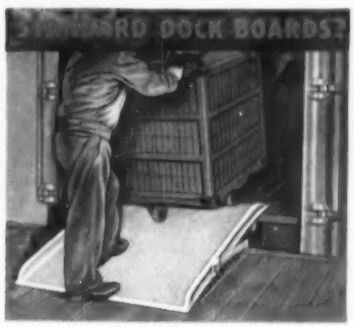
will best solve YOUR *Loading Problems?*



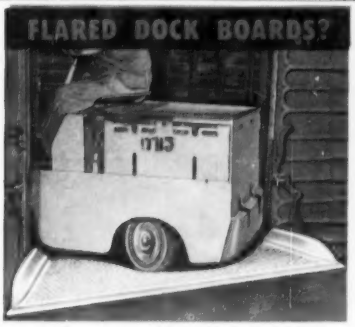
There is a wide variance in the size, height, and widths of modern motor freight carriers. These factors accordingly, are of prime importance in providing the right truck dock board, and must be taken into full account along with the specific requirements of your dock and loading equipment.



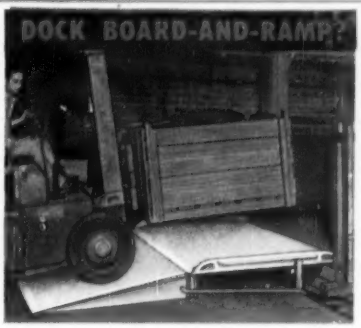
Freight cars too, vary greatly in type, overall width, door width, etc. Here again these important factors must be carefully considered to get the most from your dock board. Magliner Dock Boards give you the most, because they are engineered specifically to meet the requirements of your dock . . . equipment and operating conditions!



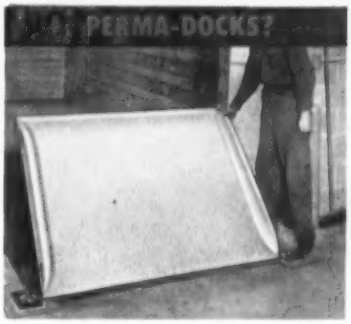
For handling light loads under normal conditions, Magliner Standard Dock Boards for truck docks are ideal. Standard dock boards are available in a wide range of sizes. They are equipped with Magline's patented, automatic drop lock, and are fully adjustable for varying differences in height and span. Immediate shipment from stock.



Where narrow aisles and crowded, cramped quarters prevail, flared dock boards are recommended to provide maximum facility for equipment movement. Magliner flared dock boards permit sharp turns to be made in restricted areas. This provides easier access into carriers—and often much of the turn can be made on the board itself.



Magliner dock board-and-ramp combinations are recommended where dock-to-carrier height differences exceed the normal range. Use of the board-and-ramp lengthens the slope and modifies the grade angle, for safe and efficient operation. These 2-piece units are lightweight and easily positioned by one man. The dock board can be used independently of the ramp.



Where permanent installations are indicated, Magliner Perma-Docks provide many outstanding advantages! They save up to 65% in installation costs over other dock systems, and give years of cost-free, maintenance-free operations. No counter balances or costly leveling devices required. One man easily raises or lowers the dock board.

A loading dock on wheels! Where you want it . . . when you want it! Ideal for servicing yard cars or highway trailers. Lightweight—easily moved about. Hydraulic lift positions it. More and more firms are using Magliner Mobile Loading Ramps as an auxiliary loading unit to relieve overtaxed dock facilities. They're practical, economical, and efficient!

Your dock and its requirements—your equipment and loads—your operating conditions . . . these are the factors which determine the type of dock board that will best solve your loading problem. Regardless of which type Magliner board you require, it will have all of the outstanding design and construction advantages which have made Magliner a recognized leader in this highly specialized field.

It will pay you to investigate the many ways in which Magliner Dock Boards can reduce loading costs, and step-up dock handling efficiency. Write today for your copy of Magliner Bulletin DB-204.

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What is Franchise Circulation?

Franchise Circulation is the method devised by Industrial Publishing more than twenty years ago, to reach those individuals, regardless of title, who control specification or purchase in the markets served by its magazines.

How is Franchise Circulation Secured?

Wholesale distributors in the field served by the magazine, subscribe to the magazine for the men their salesmen designate as the active sales decision-makers. They are the men *your* salesmen have to convince to make a sale.

How is Franchise Circulation Kept Current?

The distributor pays twelve cents a month for each copy we mail for him, and changes in his list are made monthly. The changes are made by his own sales staff, who are alert to see that the magazine continues to reach those people who can buy from them.

How does Franchise Circulation Help Your Sales?

The distributor salesman who named the man who gets the magazine did so because he has to sell him. So do you and your competitor. When he picks up the magazine of his industry, to read about its products and its processes, he has the leisure and the interest to be paying attention to the very problem that you can help him solve. That's the showcase for your advertising story . . . before The Right Man, in the Right Place, at The Right Time.

How Does Franchise Circulation Help Your Salesman?

When your advertisement has reached The Right Man,

(a) It can lead to an inquiry, which will give your salesman an active lead, since it came from the man with the power to buy.

(b) It can develop an interest in The Right Mind, making later entree for your salesman easier.

(c) It can repeat your salesman's story many times after his call, keeping alive the investment he has made in calling.

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